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ALTHOUGH crude rubber prices in the United States have risen somewhat, the submarine menace has as yet affected the supply scarcely at all. Nevertheless, the importance of a larger merchant marine grows daily in the minds of rubber, cotton and other importers and exporters of raw materials and manufactured goods. American commerce of every sort is carried on to a great extent in foreign bottoms, principally British, and as more and more ships have been requisitioned for war transport, and the toll of sinkings has increased, both importers and exporters have oftener experienced annoying delays and higher cargo rates because of the lack of adequate tonnage. Henceforth we shall have the full benefit of our armed merchantmen, but if, as now seems likely, the United States is destined to suffer greater losses through ruthless submarine activities the need of ships is likely to become more pronounced.

London and Berlin figures are widely at variance, but submarine warfare, measured by either, has thus far

fallen considerably short of its aim. Yet the campaign can hardly be said to be altogether a failure, although the list of submarines captured and destroyed is also believed to be a large and growing one. British embargoes and greatly restricted imports will minimize the effect of ship losses and conserve cargo space to the utmost, but, of course, British exigency will have first consideration in determining to what British cargo space shall be devoted.

The question whether America can have a merchant marine of its own worthy of the name is already answered. Bureau of Navigation statistics show that we can and do have one of more than 4,000,000 gross tons, exclusive of lake and river trade, that ranks second in the world's list, although only one-fourth England's tonnage at the outbreak of the war. Better still, last year was the third best in our shipbuilding annals. There were constructed in American shipyards 1,163 vessels of 520,847 gross tons to sail under the American flag, 886 vessels of 405,744 gross tons being for foreign trade. The figures for 1917 promise to be much more encouraging, for on February 1, American private yards were building, or under contract to build, 415 steel ships of 1,529,854 gross tons and 161 wooden vessels of 207,623 gross tons, most of them for ocean trade. Inadequate as is our new merchant marine, it provides the foundation upon which standardized construction and bulk production, as in the automobile industry, will build a great overseas carrier system of the future if properly safeguarded.

As a result of the war, high freight rates and scarcity of tonnage have rendered shipping under American registry very profitable, but this will not long continue with the coming of peace. The certain prompt replacement of British and European tonnage will in a few years reverse the situation unless preventive measures to promote our own reawakened shipping industry are taken in time. It is a national duty to protect the capital so courageously invested under only temporarily favorable circumstances in this potential American asset. Our shipping laws must be such that we can meet our own cargo requirements and compete successfully with other nations for a rightful share of the world's commerce.

RAILWAY SERVICE MUST BE MAINTAINED.

THE epochal decision of the United States Supreme Court upholding the constitutionality and enforceability of the Adamson law, establishing an 8-hour day in computing railway wage schedules, appears permanently to have eliminated the probability of future transportation paralysis such as twice threatened to imperil the nation during a gravely momentous period in its history and to bring American industry virtually to a standstill. The majority opinion is of far-reaching importance in declaring that both carriers and employes engaged in interstate commerce charged with public interest are sub-

ject to compulsory arbitration by Congress of differences affecting operation.

The agreement reached between the railway managers and the four brotherhoods to avert a nation-wide strike should by no means be overlooked, however. As a result of their public-spirited concession, previous to the court decision, the railway managers emerge with great credit from the controversy. It now remains for organized labor to make good its own recent pledge of patriotism, supporting the President in any measures he may deem it necessary to take as the international situation develops. Of course, in increasing operating expenses approximately \$50,000,000 a year in trainmen's wages, the railway managers have paved the way for a ruling by the Interstate Commerce Commission granting higher freight rates. The public will later hear of this through local storekeepers of every sort, but the public has an extraordinary liking for indirect taxation such as this in contrast with higher passenger rates which all can see.

THE EGYPTIAN COTTON EMBARGO.

THE embargo on shipments of Egyptian cotton from Alexandria and Liverpool, recently declared by the British Government, has the appearance of an unnecessary precaution. While the Indian cotton tariff is likely to be of direct benefit to Great Britain in the conduct of the war, this embargo is not of equally certain intent. Possibly she desires to place the importation of cotton by the United States under control similar to that of rubber, yet it is doubtful that much, if any, Egyptian cotton reaches British enemies through American re-exports. Shipments to the United States have shown a steady increase, it is true, but the manufacture of automobile tires has made a corresponding growth. A conservative estimate places the 1917 output at 25,000,000, and it is for tire fabrics that most of the imported Egyptian cotton is used.

A significant sidelight on the present situation is seen in the keen interest now being manifested by tire manufacturers in long-staple cotton planting, to the details of which an article on another page is devoted.

PENALIZING CARELESSNESS.

ACCIDENT compensation laws are highly commendable, and it is an indication of progress that 33 states have enacted such legislation with numerous amendments. Unfortunately, however, these acts are so widely at variance, both in safeguards required and damages prescribed, as to render it a considerable task for firms engaged in interstate business to keep tabs on all of them and avoid violating the laws of one state while abiding by those of another. Real need of uniformity exists, and with the coming of standardization several reforms should be inaugurated. A national bureau on uniform safety devices for each industry is needed, and

deformed persons should be insured a fair chance to secure employment.

The most important reform, however, lies in the direction of penalizing carelessness. Statistics show that year after year accidents due to carelessness of the injured greatly exceed those due to lack of safeguards, yet not one of the states having accident compensation laws takes this cause into consideration. Many accidents attributed to carelessness are in reality the result of employes misrepresenting their ability when being hired, and therefore being assigned to work for which they are unqualified. Obviously, the employe as well as the employer should shoulder his just portion of the liability. Uniform laws in justice to all will be admittedly difficult to frame, but the matter deserves earnest, impartial study and early action.

F. M. S. RUBBER EXPORT TAX.

THE disposition of American rubber manufacturers to extend their Far East plantations has led to protective measures on the part of British rubber interests. The initial step was taken by the Federated Malay States when a so-called "War Taxation Enactment," effective for one year from January 1, 1917, was passed, imposing export taxes on rubber and tin in addition to the regular customs duties. When the price of cultivated rubber does not exceed 2s. 6d. per pound, the tax is 2½ per cent ad valorem, otherwise 5 per cent. British property owners liable to pay an income tax on the profits from exported rubber are exempt from this export tax. Similar preferential enactments are likely to result elsewhere under British suzerainty. While obviously detrimental to American interests this is deemed an act of justice to the pioneers who risked their capital in building up the plantation industry of Malaya.

THE MOTORIZATION OF THE CIRCUS.

THE noble horse has made his last stand as a transportation necessity, and lost. For many years the motor vehicle has been usurping his place for pleasure driving, heavy hauling, light deliveries and fire service. In the world war, too, much of his former work is being done by motors. And last month came the announcement that even the circus manager is forsaking him, except for show purposes. The world's first motor truck circus, to be launched in May by the United States Circus Corporation, promises to revolutionize the outdoor amusement business, if not several lines of purely commercial transportation. The experiment will be watched in several quarters with the utmost interest because the severity of the test may bring about a distinct change in the type of solid tires for heavy trucks. At the outset both trucks and trailers will be equipped with large, single-tread solid tires designed to supply what the dual tread lacks in traction, even wear and extraordinary strength necessary to resist the strains of heavy service.

The Nature and Uses of Rubber Solvents—II.

By Lothar E. Weber, Ph. D.

[In the first instalment of this article Dr. Weber discussed gasoline, including casing-head and cracked gasoline, its characteristics, more desirable methods of designation, uses in dipped goods and cements, and solvent recovery.]

BENZOL.

NEXT to gasoline the most important solvent which finds commercial utilization in the rubber industry is benzol. While there is a definite chemical compound of this name, the term benzol is used in a generic sense to denote certain liquid hydrocarbons which are found in coal-tar.

When bituminous coal is subjected to destructive distillation,* there is obtained (1) illuminating gas, (2) an aqueous liquid, the most important constituent of which is ammonia, (3) coal-tar, and (4) a residue of coke. The coal-tar is a viscous liquid of characteristic odor. It is intense black in color, due to the presence of suspended particles of carbon. This is the same coal-tar which, as the basis of many dyestuffs and medicinal preparations, has been so widely discussed during recent years. It is a highly complex mixture, containing as it does, substances of widely different characteristics and properties. Amongst them is benzol, which is present to the extent of only about 1.5 per cent.

By subjecting the coal-tar to distillation, the benzol is separated from the remaining substances. As has already been stated, the term benzol is used to designate a group of generic hydrocarbons, which latter bear very much the same relationship to each other that the paraffin hydrocarbons do. Fortunately the gravity nomenclature is not used in designating these hydrocarbons, they being referred to technically on a boiling point basis. By "Benzol Pure" one infers a solvent consisting essentially of the chemical substance known as benzol. This material has a constant boiling point of 80.4 degrees C. (177 degrees F.) Under "100 per cent Benzol" one designates the material which is 100 per cent distillable at 100 degrees C. The material which is 90 per cent distillable at 100 degrees C. is referred to as "90 per cent Benzol." This nomenclature is a logical and desirable one, in that it enables a purchaser at a glance to know the comparative boiling points, and hence the volatility of the solvent.

In the United States it is the 90 per cent benzol which probably finds the largest application in rubber manufacture. This product consists of about 70 per cent pure benzol, the residue being for the most part toluol. The 90 per cent benzol is seldom used for spreading purposes, but it finds considerable application in the manufacture of cements and dipped goods, and to a certain extent in the cold cure.

Benzol—meaning thereby 90 per cent benzol—is much to be desired over gasoline as a rubber solvent. It is in the first place a more uniform product, has a much narrower range of boiling points, and largely increased solvent power. Whereas a gasoline solution is always opaque in appearance, a benzol solution of rubber is clear and transparent. There is no indication of any suspended matter being in the rubber solution, which is always the case when gasoline is used as a solvent. Probably on account of this homogeneity the film resulting from a benzol solution of rubber is stronger in its physical properties, and at the same time more transparent in appearance, than is the film produced from a gasoline solution. The range of boiling points being narrower, there is less chance for the formation of blisters in the case of dipped goods and blowing in the case of cement when benzol is the solvent employed. Under present conditions the price of benzol is more than double that of gasoline, but after cessation of hostilities the discrepancy in their prices will

probably be slight, owing to the vastly increased benzol production in this country. When such is the case, it will be very much to the advantage of the rubber manufacturer to substitute the utilization of benzol for gasoline in dipped goods and cements.

SOLVENT NAPHTHA.

This material is also obtained from coal-tar and has no relation whatsoever to any petroleum product. Its boiling points range from about 140 degrees C. to 170 degrees C. It consists essentially of two hydrocarbons known as xylene and cumene.

Solvent naphtha has never found wide application on the part of the rubber manufacturer in the United States, though it is used very extensively in Europe. Gasoline is used to a moderate degree by the European rubber manufacturer, and scarcely ever in the spreading operation, except in limited admixture with solvent naphtha. The claim is authoritatively made that gasoline itself cannot be used with any degree of safety in England for the spreading operation, the peculiar atmospheric conditions which obtain creating an excessively precarious fire risk. It is, indeed, a fact that in the days prior to the development of the internal combustion engine when gasoline was a drug on the market, European manufacturers used solvent naphtha almost exclusively as the spreading solvent, and this in spite of the fact that the latter, as produced abroad at that time, had serious objections in that it imparted an odor to the spread compound. The odor is due to the very disagreeably smelling substance known as pyridine, which even when present in the solvent to the extent of less than 0.1 per cent, makes itself exceedingly offensive. The solvent naphtha produced in America is almost invariably free from even these minute traces of pyridine, as also is the European product as usually marketed within recent years.

SHALE OIL.

In Scotland, and, to a certain extent in Germany, the destructive distillation of certain bituminous shales is carried on quite extensively. Shale is a rock formation, usually of a brownish or gray color, which is permeated with bitumen. The shale is heated in retorts, whereby the bitumen suffers destructive distillation. From the tar resulting on distillation there is obtained shale naphtha, which has physical properties analogous to the solvent naphtha obtained from coal-tar. While shale naphtha has found very little application in America, it is used quite extensively in Europe for purposes where the odor does not militate against its use.

CARBON BISULPHIDE.

This solvent is made by the interaction of carbon and sulphur. The older method of passing sulphur vapor over coke or charcoal, heated to a red heat, has been practically superseded by the electrical method, whereby the two components are heated in an electric furnace. Carbon bisulphide, when strictly pure, has a sweetish, pungent odor, although the article of commerce is more or less evil smelling, owing to the presence of certain sulphur impurities. Carbon bisulphide boils at 46 degrees C., and even at ordinary temperatures is extremely volatile. Great care has to be exercised in the handling of it, for the reason that its vapors are inflammable when heated only to the relatively low temperature of 150 degrees C. When carbon bisulphide burns, there is produced sulphur dioxide and carbon dioxide, both extremely suffocating and irritating gases.

*By destructive distillation is meant the heating of a substance, in the absence of air, to a temperature at which decomposition results.

Carbon bisulphide finds practically only one application in the rubber industry and that is as a diluent for sulphur chloride in vulcanization. Owing to the disagreeable properties of carbon bisulphide just enumerated, many attempts have been made to find a substitute for it. While combinations of solvents have been obtained which give passable results, it is, indeed, a fact that nothing has been found which can replace carbon bisulphide with complete satisfaction.

The sulphur chloride cure is essentially a surface vulcanization, both in the case of the vapor cure and the wet cure. It is the surface of the rubber article which is primarily subjected to the action of the sulphur chloride. To be sure, the rubber below the surface is also acted upon, but, broadly speaking, except in the thinnest of articles, the sulphur chloride cure is not a thoroughly uniform one in the direction of the thickness of the article. Obviously the greater the penetration of the sulphur chloride and the quicker this penetration, the more uniformly will the rubber be cured. It is an observed fact that carbon bisulphide has the property of penetrating crude rubber to a remarkable degree. In fact, it stands preeminent among the commonly employed solvents in this respect, and it is on

account of its property of penetration that carbon bisulphide gives such satisfactory results in the sulphur chloride cure.

CARBON TETRACHLORIDE.

Carbon tetrachloride is made by the action of chlorine on carbon bisulphide, sulphur chloride (the curing agent) being produced simultaneously. Carbon tetrachloride is a heavy liquid of sweetish odor, boiling at 78 degrees C., and is not in the least inflammable. In fact, its vapors form a protective curtain around any burning article upon which the liquid is cast, a property of carbon tetrachloride which finds extensive application in the utilization of this substance as a fire extinguisher. Carbon tetrachloride is employed to a certain extent as a substitute for carbon bisulphide in the cold cure. Owing to its non-inflammability, and more agreeable odor, it has an advantage over carbon bisulphide, but from the standpoint of vulcanization, carbon bisulphide is the more preferable diluent. Somewhat more satisfactory results are obtained by using a mixture of carbon tetrachloride and benzol. This mixture is the closest approach in its properties to carbon bisulphide that has yet been found, but as a diluent for sulphur chloride could scarcely be said to be the full equal of it.

Egyptian Cotton in Arizona by Irrigation.

COTTON came into its own again in 1916 as a result of the war demand and Federal financial aid, yet the increased production of long-staple varieties was relatively small. Yarn spinners and fabric manufacturers have for several years past deplored the limited and uncertain supplies of American long-staple cotton, and last season was no exception. It now remains to be seen how long it will be before they take matters into their own hands and remedy the situation.

NEW UPLAND VARIETIES.

The production of long-staple cotton constitutes one of the great undeveloped agricultural resources of the United States and one that is capable of enormous expansion. For several years the industry declined because the boll weevil invaded the former long-staple districts of the lower Mississippi valley, but the introduction of early-maturing long-staple varieties by the United States Department of Agriculture and the tested fact that cotton can be grown by irrigation in undeveloped localities of the Southwest have injected new factors of far-reaching importance.

Such varieties as Columbia, Foster, Express and Durango, the latter grown extensively in Imperial Valley, California, can, by observation of the necessary precautions, be grown over a large part of the cotton belt, and are less subject to insect ravages than the older late-maturing varieties. Under improved cultural methods, with the aid of uniform conditions assured by irrigation, and by adoption of early-maturing varieties long-staple can now be grown more cheaply than in former years. While long-staple cotton for a period of several years past has averaged 60 per cent higher in price than corresponding grades of short staples, it can now be grown profitably at an average premium of 30 per cent. Undoubtedly the resulting tendency will be toward the substitution of higher-grade cotton in many classes of manufactured goods for which short staples, although now used, are but poorly adapted.

The earliness of these new varieties is represented not so much by the date when the bolls begin to open as by the setting of the crop in a shorter period of time after flowering begins. Contrary to the belief of many conservative planters, these varieties are nearly if not quite as productive as short-staple varieties with similar habits of growth; indeed, have outyielded them in many experiments. These advantages, coupled with the greater in-

trinsic value of the product, are tremendous arguments in favor of its culture, and with the steadily increasing demand for long staples the discouragingly wide price fluctuations of the past from season to season will surely be lessened, so that the long-staple planter need not fear finding himself at a disadvantage with growers of short staples.

PRECAUTIONS IN GROWING LONG STAPLES.

This is as it should be, for long-staple cotton growing requires not only more favorable natural conditions, but greater skill and care on the part of the producer, who is justly entitled to a greater reward. Successful long-staple cotton culture cannot be maintained by ordinary cotton-farming methods. Particular attention must constantly be given to maintaining stocks of pure seed by continued selection, avoidance of crossing varieties in the field, and admixture of seed at public gins, else the crop in two or three years will surely decline in quality as well as in quantity. Obviously degeneration will manifest itself more quickly than in short staples, because the requirements of uniform quality are higher.

COMMUNITY PRODUCTION ESSENTIAL.

Thus it becomes apparent that scattered individual efforts are precarious, and that success lies in community production of a single superior variety. Indeed, community organization is as essential to the maintenance of quality as to the marketing of the crop, and manufacturing interests entering the planting field do well to cooperate with such organized communities where a single long-staple variety is grown rather than to risk failure elsewhere. Egyptian cotton is therefore indicated in Salt River Valley, Arizona, and Durango, a long-staple Upland variety, in Imperial Valley, California.

EGYPTIAN COTTON IN SALT RIVER VALLEY.

It was to compete with Sakellarides, imported in great quantities, that experiments were begun in Egyptian cotton culture in Arizona in 1902. Ten years later the industry was inaugurated commercially, and proved successful. While it has not assumed large proportions, it promises to do so during the next few years because of virtually ideal conditions. Last year about 7,000 acres were under cotton and a well-balanced agriculture in Salt River Valley would permit 20 per cent of the total project, or 50,000 acres, producing as many bales annually. Similar con-

ditions exist in the Yuma Reclamation Project on the lower Colorado River, which includes a total of 100,000 acres, or 20,000 available for cotton. For the assistance of farmers a well-equipped experiment farm is maintained in each irrigated district by the Department of Agriculture.

In Egypt, cotton is grown entirely on irrigated land and in a climate practically rainless throughout the period of development of the cotton plant. This absence of rain, especially during the picking season, favors the production of clean cotton. Conditions in Salt River Valley, therefore, are substantially the same, except for the advantages of freedom from the boll weevil, pink boll worm and most other insect pests, and but slight occurrence of Hindi, or "weed" cotton contamination which renders difficult the maintenance of pure seed. Probably the higher valuation of land and cost of irrigation water in Egypt, together with less efficient hand methods of tillage, nearly if not quite offsets the higher cost of labor in America, which is felt chiefly in picking. As the crop-producing capabilities of the land in the two regions are much the same, and in staple and quality of fiber the commercial value of the Arizona crop compares favorably with the best of the Egyptian varieties, such as Jannovitch and Sakellarides, the difference to the American manufacturer lies chiefly in the freights, that by rail to New England from Arizona being normally about three times as much as from Egypt to America by water. There are several methods of surmounting this handicap, but a consideration of them is beyond the scope of the present article. Suffice it to say that comparatively little difficulty has been experienced thus far in disposing of the crop at satisfactory prices, due no doubt to the realization on the part of progressive manufacturers that new American sources of long-staple cotton should be developed and encouraged while in an experimental stage.

YUMA COTTON.

Two varieties of uniformly high quality long-staple cotton known as Yuma and Pima are available for Arizona planting. Both were bred up by the Bureau of Plant Industry of the Department of Agriculture by selection from the Mit Afifi variety of Egypt, and are of a sort not available anywhere in Egypt. As segregated in 1908, the Yuma variety is distinct in the character of the plant and of the fiber. The lint ranges from 1 7/16 to 1 9/16 inches in length, according to soil and cultural conditions, and has the pale, pinkish buff color of Jannovitch cotton rather than the deeper buff color of the original Mit Afifi. The lint averages about 28 per cent. Yield and spinning tests during the past eight years have demonstrated that a stable variety, uniform in character and of good spinning quality, has been developed.

PIMA COTTON.

In 1910 another distinct type was segregated from the Yuma and given the name of Pima. This superlatively excellent new strain surpasses the parent variety in productiveness, size of the bolls, length and quality of the fiber, greater freedom from limbs, and general uniformity. The Pima fiber staples from 1 5/8 to 1 3/4

inches and is finer and lighter colored than Yuma. The upward vegetative branches are fewer and shorter, the fruiting branches, especially the lower ones, longer and better furnished with bolls. Because of these facts more light reaches the lower part of the plant, the crop matures earlier, the early bottom crop is heavier, and picking is easier. In lint percentage it differs but slightly from Yuma, the tendency being in favor of the latter. Spinning tests encouraged the substitution of this variety for Yuma, and during the season of 1916 it was grown for the first time commercially in the Salt River Valley. Seed enough to plant about 5,000 acres of this variety was produced, and by the spring of 1918 there will be seed enough to plant 100,000 acres or more.

SEED SUPPLY.

A Yuma seed supply of uniform quality is maintained by the Salt River Valley Egyptian Cotton Growers' Association under the supervision of Department of Agriculture experts. This cotton is grown in isolated places to prevent crossing, and under as nearly ideal conditions as possible. Early in July, soon after blossoming begins, every plant is examined and those of inferior quality are rogued to prevent contamination of others with their pollen. Thus the seed for general planting this year was derived from the fields rogued in 1915, and can probably be sold at only a slight advance above current oil mill prices. It is sufficient for 100,000 acres or more.

COTTON IN ROTATION WITH ALFALFA.

To be profitable, Egyptian cotton farming must be not a single crop culture, but part of a system of crop rotation in which alfalfa, for instance, is alternated occasionally with cotton. In past years, profit in alfalfa has depended upon growing livestock to consume it and involved heavy overhead expenses which cotton spinning and weaving companies have hesitated to assume. But the livestock industry of Salt



AN ARIZONA IRRIGATION CANAL.

River Valley is assuming such proportions as to provide a ready market near at hand. Indeed, alfalfa occupies over half the irrigated land and is the basis of agricultural operations in that locality.

Cotton and alfalfa culture greatly benefit each other. Alfalfa brings a good cash return, puts humus into the soil and provides an ideal enrichment for subsequent cotton growing, while cotton renovates the soil of weeds. As a result of continued planting, alfalfa fields become badly infested with Bermuda and Johnson grass. One or two well-tilled crops of cotton, however, will leave the land in excellent condition again for alfalfa or for any crop, as the cultivation between the plants when young and the complete shading of the ground later in the summer kills weeds of every sort. Little, if any, more than half as much irrigation water per season is required for cotton as alfalfa, so that expansion of cotton culture in Salt River Valley may ultimately lead to extension of the irrigated area.

COST OF PRODUCTION.

Estimates of the cost of production have been prepared for the Department of Agriculture by W. S. Dorman, who has had over four years' growing experience in Salt River Valley, and

as president of one of the growers' associations has had access to all the facts. His figures, including interest on the land investment and deducting the value of seed produced, are as follows:

Item of cost.	Cost per acre of	
	Two-thirds of a bale.	One bale.
Plowing, preparing soil, cultivating, and seed.	\$15.00	\$15.00
Irrigation water	1.50	1.50
Picking seed cotton.....	24.00	36.00
Transportation to gin.....	2.50	3.00
Ginning lint, at 2 cents per pound.....	6.72	10.00
Interest on \$150 at 8 per cent.....	12.00	12.00
Total cost	\$61.72	\$77.50
Value of cottonseed at 75 cents per 100 pounds	6.15	9.26
Net cost of lint.....	\$55.57	\$68.24

This shows the net cost of production per pound of lint as 16.66 cents when the yield is two-thirds of a bale per acre, and 13.65 cents when the yield is one bale per acre. On a 40-acre tract which yielded nearly a bale and a half to the acre in 1914, the cost was reduced to 12.37 cents. The detailed table which follows indicates the importance of securing large yields per acre if the industry is to be made profitable.

Item of cost.	Cost per acre.
Seed and tillage.....	\$15.10
Irrigation water	2.00
Picking 2,552 pounds of seed cotton, at 2 cents.....	51.04
Ginning, insurance, yardage, and association of expenses	15.98
Interest and taxes.....	17.25
Total cost	\$101.37
Receipts for cottonseed	10.32
Net cost per acre.....	\$91.05
Yield of cotton lint per acre, 736 pounds; net cost of lint per pound	12.37

TILLAGE METHODS.

The best methods of preparing the land for Egyptian cotton and of irrigating and cultivating the crop have been described in detail by E. W. Hudson, of the Bureau of Plant Industry, in Farmer's Bulletin 577, for free distribution by the United States Department of Agriculture. Briefly, they consist in early and thorough preparation of the land; careful leveling, so that the entire field can be irrigated uniformly and with less water; early planting; getting the seed into moist soil; late thinning; leaving the plants close together in the row; the sparing use of irrigation water until the plants blossom; thorough cultivation as long as the size of the plants permits; and frequent light irrigation after blossoming begins until the crop is fully matured.

As Egyptian cotton requires a growing season of about nine months, or several weeks longer than Upland, and as cotton ripened in October and November is always superior to that ripened later, planting should occur as early in March as possible after the danger of frost is over.

PREPARATION OF THE LAND.

This implies early preparation of the land, which should be begun in the previous autumn and continued through the winter. Although some raw desert land will grow good cotton, land previously in alfalfa will produce better cotton more economically and with less irrigation, as the soil holds the water better and requires no separate irrigation of lighter spots. Such land

should be plowed 2 inches deep in October or November, turned up to the sun until thoroughly dry, and then plowed again in January 4 to 6 inches deep. Land to be planted a second time in cotton should be gone over with a stalk cutter and then plowed, disked and harrowed thoroughly. Preparation of new land infested with Bermuda and Johnson grass should be begun as early as August, followed in October or November, and again in January or February by deeper plowing, disk, harrowing and cultivating to bring as many roots as possible to the surface. These should be raked up and burned. It may cost \$6 to \$10 an acre to clear new land.

PREPARATION OF THE SEED BED.

Land previously in cotton or grain, if irrigated before plowing, can be put in condition by one plowing. Land previously in alfalfa should be plowed twice. Late in February borders should be thrown up about 2 rods apart, and just before planting the land should be flooded and then disked and harrowed.

PLANTING.

Use a two-horse planter while the ground is still moist enough to insure seed germination and plant in rows 3 feet apart on new land or 4 feet apart on alfalfa land. Plant to an average depth of $1\frac{1}{4}$ inches with 40 to 50 pounds of seed per acre.

EARLY CULTIVATION.

Begin cultivation as soon as the plants are visible, in order to break any crusts that may have formed, to check evaporation, and to kill the weeds.

EARLY IRRIGATION.

New land may require water sooner, and three or four times before July 1, but alfalfa land after 6 to 8 weeks will require light furrow irrigation followed by cultivation as soon as the ground is dry enough to work, and again in 10 to 14 days. Repetition of this treatment after three or four weeks will be all the water required before July 1. Cultivation should follow any rains that occur.

THINNING.

After the second irrigation, when the plants are 8 to 10 inches high and have 10 to 12 normal leaves, they should be thinned to 4 to 6 inches apart in the row on new land and 6 to 16 inches on alfalfa land, depending on the richness of the soil. The idea is to obtain a uniform stand and consequent larger total yield. Thinning in two operations has the advantage of insuring enough plants to replace any that may be killed during later cultivation, and the comparative closeness of the plants until the final thinning favors the fruiting branches at the expense of the larger unproductive vegetable branches. Thinning can usually be contracted out at \$1 per acre.

LATE CULTIVATION.

Cultivation should continue every 10 or 15 days, as long as a horse can be driven between the rows without damage to the plants. After the plants have 8 to 10 leaves this should be so done as gradually to draw earth toward them until the plants are on a ridge 3 to 4 inches high and 12 to 14 inches wide. This insures more even distribution of water during the late irrigations and conserves moisture around the plants. After cessation of horse cultivation, the middle of the rows may be gone over once or twice with a single-row 7-shovel or spike-tooth cultivator.

LATE IRRIGATION.

From July 1 until after October 1, most soils require irrigating, not exceeding a 6-hour run, every 10 or 15 days to prevent wilting of the flowering plants during the middle of the day. The water should be drained off in each instance and not allowed to stand in the lower part of the field to damage both crop and land. At least two irrigations should be given after the first picking.

PICKING.

At least three pickings are necessary, and these should begin between September 15 and October 1, but not until 600 to 1,000 pounds of seed cotton per acre can be obtained. This is desirable in order to bring the second picking rather late in the season. Each picking, and any frosted cotton, should be kept separate in ginning and baling, as there is often a marked difference in grade. Picking Egyptian cotton requires greater care and is more expensive than picking Upland cotton because of the smaller size of the bolls and the necessity to keep the seed cotton clean so that the quality of the lint will not be impaired nor its selling value reduced. Then, too, no dependable cleaning device has been found which can be attached to the roller gin. Hand labor is neither abundant nor cheap in the Southwest, but Salt River Valley is better provided for than some other sections, because of the Pima and Papago Indians, two capable, industrious tribes which are taking up this work with satisfaction to themselves and their white employers. A force of 5,000 to 7,000 is available. Two cents per pound is the price paid, and pickers vary from 100 to 200 pounds a day according to aptitude and experience.

GINNING.

Four ginning establishments, each equipped with 10 roller gins, and devoted exclusively to ginning Egyptian cotton, are located at Phoenix, Tempe, Mesa and Chandler, while the cottonseed products are taken care of by two oil mills in Phoenix. The cost of ginning is usually somewhat less than \$10 a bale, although more than twice that of Upland cotton in the South. This is due to the fact that the roller gin used for the Egyptian cotton cannot be operated as rapidly as the customary saw gin, but improvements in the mechanism promise a considerable measure of relief in this particular stage of handling.

[In the preparation of the foregoing article we are indebted to Farmer's Bulletins and miscellaneous other circulars and papers prepared for the Department of Agriculture by C. S. Scofield, T. H. Kearney, C. J. Brand, O. F. Cook and W. T. Swingle, constituting the Committee on Southwestern Cotton Culture.]

H. Muehlstein & Co., scrap rubber dealers, New York City, celebrating their recent removal to new quarters, are sending out a neat souvenir in the form of a pocketbook which, while small enough to fit in the ordinary vest pocket, has a quite generous capacity. A bill fold with protective flap occupies the entire length of the three folds. The inside has a celluloid-covered card for filling out identification information of the owner, a section devoted to loose leaves for memoranda, with accompanying pencil, a small pocket containing a book for postage stamps and an enclosure for a year's monthly calendars. On the outside are four separate and distinct pockets for cards, tickets, memoranda, etc., one of these having a flap with ball and socket fastener. The advertisement of the firm is stamped in gold, thus forming a permanent reminder of the giver.

SEA ISLAND COTTON.

FARMER'S BULLETIN 787, by W. A. Orton, pathologist in charge of cotton and truck disease investigations of the Bureau of Plant Industry, United States Department of Agriculture, provides a comprehensive manual for the cotton planter, covering geographical distribution of Sea Island cotton in the United States; ideal crop requirements; possible extension of the Sea Island cotton producing area; markets; factors governing prices; defects in economic conditions; cultivation; fertilizers; preparation of the land; seed selection; handling the crop; diseases.

As to the possible extension of the Sea Island cotton-producing area the author writes:

There is little encouragement to offer to those who would attempt to introduce the culture of Sea Island cotton into other parts of the country than where it is now grown (South Carolina, Georgia, Florida). Many such trials have been made during the past hundred years, and all have failed. Even in the present area the crop is losing rather than gaining ground in competition with Upland cotton, although the production of Sea Island cotton might be increased if market conditions warranted.

In addition to the effect of high prices in stimulating the industry and of low prices in depressing it, a factor which must be considered in connection with the production of

cotton in either old or new sections is the supply of available labor. Until present methods are revolutionized a relatively large amount of fairly cheap labor is required, and it is a great advantage if the laborers have had long experience with the crop. Throughout the Sea Island cotton belt there is now a growing scarcity of labor, which is likely to restrict the acreage planted. The farmers must meet the new conditions by the adoption of labor-saving machinery in planting and in cultivation, but there will continue to be difficulty in getting the cotton picked.



EGYPTIAN COTTON GROWN IN SALT RIVER VALLEY.

The development of trucking and lumbering industries restricts the less profitable cotton crop, and there is a steady exodus of laborers to engage in railroad building, etc., making the labor problem still more serious.

Serious obstacles are met with in introducing Sea Island cotton into a new section. There is difficulty in securing the proper care in cultivation and in picking and handling the staple. Pickers accustomed to Upland varieties object so much to the small and partly closed Sea Island bolls that it is difficult to get the cotton picked even at the prices now paid—\$1 to \$1.25 a hundred pounds. The ginning must be done on a roller gin, as the saw gin injures the staple too much, and a specially equipped ginnery is therefore necessary. Further difficulties are met with in marketing the product, which at first can rarely be sold to advantage in a local market where the buyers are unaccustomed to the Sea Island staple. Shipment to a recognized market for Sea Island cotton is necessary in such cases. (Charleston, South Carolina; Savannah, Blackshear, and Valdosta, Georgia; Alachua and Madison, Florida).

In a recent campaign in Montreal, Canada, for the Patriotic and Red Cross funds, in charge of the One Day's Pay Committee, the total amount collected was over \$4,000,000, and of this \$12,089 was contributed by employees of the Canadian Consolidated Rubber Co., Limited.

The Manufacture of Jar Rings.

THE production of jar rings has assumed such proportions as to make it a most important branch of the rubber industry. The compounded stock from which the rings are made is generally run through a tubing machine, the outside diameter of the resultant tube being slightly larger than is required to offset the reduction in size when the tube is wrapped for curing. As the stock is run from the tubing machine it is cut off in lengths of about 30 inches. These are placed on steel mandrels and wrapped tightly with strips of wet cloth, after which the tubes are vulcanized in open steam for 30 minutes at 50 pounds pressure.

After curing, the tubes are removed from the mandrels by compressed air and at the same time each tube is forced by the same means over a special mandrel upon which the rings are cut. This mandrel, upon which the tube is mounted, is revolved in the lathe at a high rate of speed and the cutting is done by sharp steel blades mounted on a traveling carriage provided with a longitudinal feeding mechanism, the cutting blades being pressed against the revolving tube by a cam or other mechanism. The cut rings are stripped from the mandrel by compressed air and then inspected, counted and packed.

An important item in the successful cutting of jar rings is the cover for the cutting mandrels. This is usually made of brass that will not injure the cutter when it passes through the

vision is made for stopping the feed shaft to prevent over-feeding of the cutter carriage, and for shutting off the power when the carriage has reached the end of its forward travel.

COFFEY'S LATHE.

In Fig. 2 are shown the front and end elevations of this

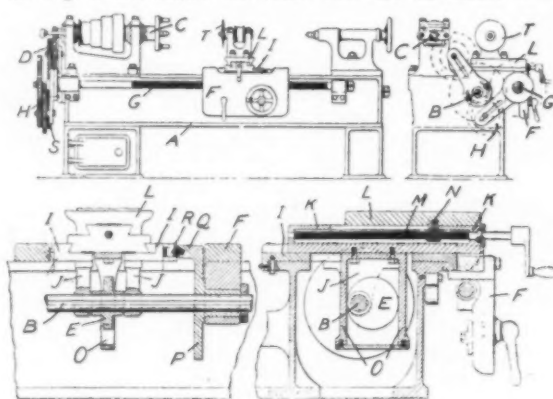


FIG. 2.—COFFEY'S LATHE.

machine. *A* is the lathe bed and *B* the cam shaft that moves the knife carriage to and from the work. Mounted on the bed *A* is the carriage *F*, which is moved longitudinally by a lead screw *G* driven from the spindle by change gears *H*. The rotary knife *I* is mounted on a short belt-driven shaft, that is journaled in the cross slide *L*, which is attached to the auxiliary slide *I* and the carriage *F*.

After the knife has been set in proper relation to the surface of the rubber tube to be cut, and the lathe started, one half a revolution of the cam will feed the knife to the required depth, while during the other half revolution the knife is withdrawn by the cam. The moment the knife has cleared the surface

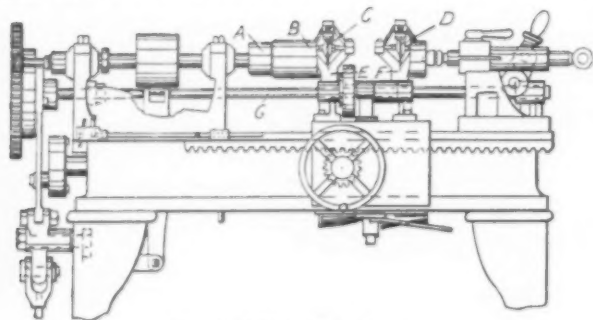


FIG. 1.—McGEUCH LATHE.

rubber. This covering was formerly a cheap grade of rubber compound, rolled on the mandrel by hand and cured in the usual manner, after which it was dressed down to size on a speed lathe. Such a covering, however, becomes so badly cut after a short time as to be rendered useless. A substitute for this covering is one of tough stock, sheeted very thin on a calender and built up to the exact diameter on the mandrel. The uncured stock will stand more cutting than when cured, and when worn out it may be stripped from the mandrel, sent to the mill room and sheeted for further use. Paper tubes are also used.

There are several types of jar ring lathes and the principle is about the same in all. However, the more recent machines show marked improvement in design and construction that makes for greater production. Descriptions of the most important machines follow:

THE McGEUCH LATHE.

The machine shown in Fig. 1 is designed for cutting two rings simultaneously. *A* represents the mandrel upon which is placed the rubber tube *B*, and *C* and *D* are circular knives mounted on shafts which are journaled in the swinging arms *E* and *F*. The knives are moved into engagement with the tube *B* by a cam on the shaft *G*. After the two rings are cut, the cutters are held in operative position while the knife carriage is moved longitudinally a distance equal to the thickness of the rings. Pro-

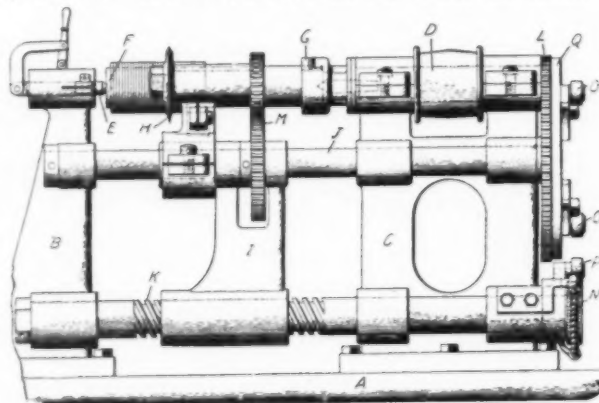


FIG. 3.—PIANAROSA'S ORIGINAL LATHE.

of the rubber, the carriage is moved longitudinally the required distance to bring the knife in position for the next cut.

THE ORIGINAL PIANAROSA JAR RING LATHE.

The jar ring cutting lathe, shown in Fig. 3, differs in design from the usual type. The feature of this lathe is an elliptical rotary cutter by means of which the rings are cut with very smooth surfaces. The drawing shows a front elevation of the machine. Secured to the bed *A* are the stands *B* and *C*. In

the stand *C* is journaled the driving shaft *D* and in the stand *B* is an adjustable center *E* which supports one end of the mandrel *F*, the other end of which is centered in the chuck *G* on the end of the driving shaft *D*. *H* is an eccentric rotary knife journaled in an adjustable bearing attached to the knife carriage *I*. This carriage slides on the shaft *J* and is moved

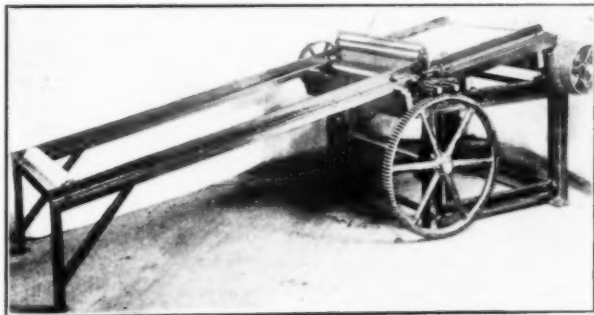


FIG. 4.—AUTOMATIC TRIMMING AND WRAPPING MACHINE.

longitudinally by the screw shaft *K*. The shaft *J* is driven from the driving shaft *D* by spur gears *L* and the cutting knife is revolved by means of the gears *M*. An intermittent feeding movement is given the threaded shaft *K* by means of the ratchet wheel *N*. This ratchet is turned a short distance each time one of the rollers *O* strikes a roller *P* on the pawl carrier. The strikers *O* are mounted on a disk *Q* on the end of the shaft *J*. The operation of the machine is as follows: The mandrel with the rubber tube upon it is placed in position, the knife support is adjusted and power is applied to the driving pulley, which revolves the mandrel and also the elliptical knife. When that part of the knife of the least radius comes opposite the tube on the mandrel, the feed shaft *K*

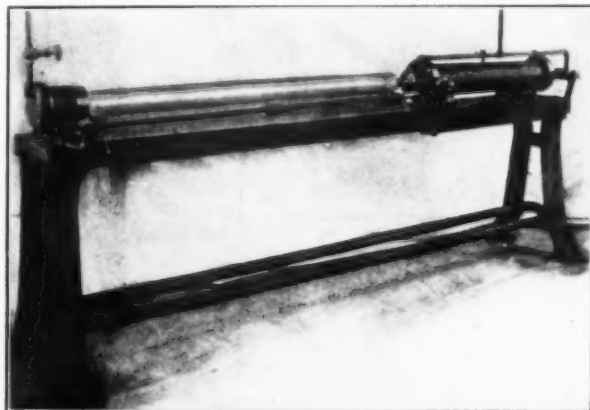


FIG. 5.—"PUSH" MANDREL MACHINE.

moves the knife carriage *I* lengthwise a distance equal to the thickness of the ring required. In this way the tube is cut into rings while the knife is in constant rotation.

Further development of the principle embodied in the above original invention has resulted in the following complete line of highly specialized machines for the manufacture of jar rings.

THE IMPROVED PLANAROSA JAR RING MACHINES.

These machines show the progress that has been made in specialized machinery used in modern rubber mills for the manufacture of jar rings. They include an automatic machine for trimming and cloth wrapping the unvulcanized tube on the

curing mandrel; a machine operated by compressed air that removes the cut rings and at the same time forces another uncut tube upon the same mandrel; a duplex jar ring lathe that automatically cuts the rings; and a special alternating grinding machine for grinding the elliptical cutters.

The uncured tube on its mandrel is placed in the right-hand end of the machine shown in Fig. 4, and the ends of the tube are accurately squared and at the same time the length determined by automatic cutters. The tube is then placed on the wet wrapper and the end brought over the tube when it is released and rolls down the incline by gravity—thereby loosely wrapping itself—to the two parallel gear driven rollers on which it rests. The upper presser roller, being automatically raised to permit the entry of the wrapped tube, is now brought down in contact with it, the power applied and after 16 revolutions the cloth is smoothly and evenly wrapped around the tube. The upper presser roller is then released and the wrapped tube rolls down the inclined plane to the end of the machine and is ready for curing.

After the tube has been vulcanized, it is blown off the mandrel by compressed air and placed on the cutting mandrel by the

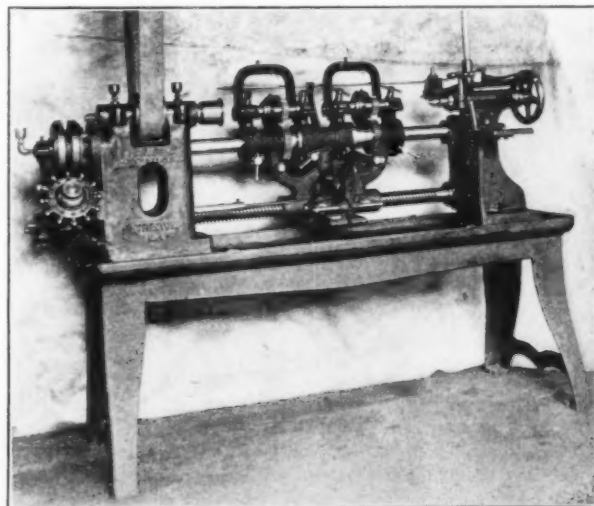


FIG. 6.—AUTOMATIC JAR RING LATHE.

machine shown in Fig. 5. This machine serves a double purpose by removing the cut jar rings from the mandrel and at the same time applying another tube to the same mandrel.

This "push" mandrel machine consists of a horizontal cylinder containing a piston that is operated by compressed air. A mandrel and tube that has been cut on the jar ring lathe is placed on the concave bed of the machine and the end adjusted to the outer end of the piston. One end of an uncured tube is slipped over the free end of the mandrel, the other tube end being attached to the automatic compressed air valve shown at the extreme left of the illustration. Compressed air is automatically released by this valve and rigidly distends the tube while the piston is operated, forcing the mandrel into the uncured tube and at the same time removing the cut rings.

The jar rings are cut on the automatic lathe shown in Fig. 6, the mandrel being placed between the centers and revolved at a fixed speed. The cutting is performed by two rotary, elliptical knives or cutters mounted on separate carriages that are driven in the same direction by a lead screw. The knife on the right starts on the right end of the tube and cuts to the left, while the other knife starts at the center and cuts in the same direction. There is no reciprocatory motion, which is the most important feature, as it permits running the machine

at a very high rate of speed. The cutting is done by the edge of the part of the elliptical cutter with the greatest radius revolving against the work. As it revolves, the cut is finished and when the part of the cutter with the least radius arrives opposite the revolving mandrel, clearance is thereby provided and the carriages are moved longitudinally for a fresh cut. The movement of the carriages that determines the thickness of the jar rings is automatically controlled by an intermittent worm gearing and star wheel mechanism together with change gears. When the cutting is completed, the machine is stopped automatically. It is claimed that this machine will produce approximately six hundred jar rings per minute.

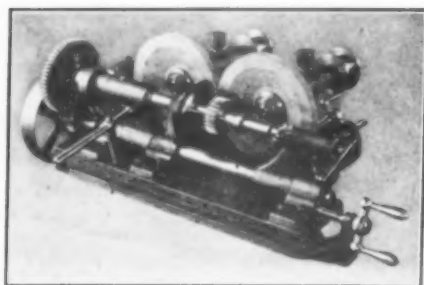


FIG. 7.—ELLIPTICAL KNIFE GRINDER.

A very necessary machine in connection with the jar ring lathe is the alternating knife grinder shown in Fig. 7, specially designed for accurately grinding the elliptical knives. It consists of two oppositely placed, belt-driven emery wheels that travel toward each other. At right angles to the emery wheel shafts are the rocking centers between which the cutter arbor and cutter to be ground is placed. The arbor is revolved by belt-driven gearing and at the same time being rocked by a cam movement so that the elliptical edge of the knife is presented to the rapidly revolving emery wheels and accurately ground.

WASTE MATERIAL DEALERS MEET.

THE fourth annual meeting and dinner of the National Association of Waste Material Dealers was held at the Hotel Astor, New York City, March 20 and 21. Louis Birkenstein, of S. Birkenstein & Sons, Chicago, Illinois, and New York City, officiated at the meeting, and in his address gave an enthusiastic account of the four years' history of the association. The election resulted in the choice of the following officers: Louis Birkenstein, president; H. H. Cummings, James Rosenberg, E. A. Stone, Henry Lissberger, Ivan Reiter and James J. Ryan, vice-presidents; Mark Sherwin, treasurer; Charles M. Haskins, secretary.

At a meeting of the Scrap Rubber Division held March 20, with Paul Loewenthal, of Brooklyn, New York, chairman, it was voted that The Rubber Association of America, Inc., be requested to have a committee meet the Classification Committee of this division for the purpose of drawing up specifications of scrap rubber which would be adopted by both organizations and should be standard for the trade; and that the secretary address a letter to the Rubber Association along the lines of the above motion.

There was considerable discussion as to the buying of mixed tires, the consensus of opinion being that this was a matter which would have to remedy itself and that there was no way for this association to control the buying of its members.

President Birkenstein also presided at the banquet held on the evening of the twenty-first, and made a ringing address which was enthusiastically applauded. Joseph F. McLean, of the Pequannoc Rubber Co., Butler, New Jersey, spoke of the valuable services which the waste material industry is rendering the country's manufacturing interests, alluding to the friendly relations existing between the rubber reclaimers and the scrap rubber trade. Hon. E. C. Stokes, former Governor of New Jersey, gave

a very interesting and witty address and a fine eulogy of the waste material industry.

A pleasant feature of the occasion was the presentation of a handsome silver loving cup to President Louis Birkenstein by the members of the executive committee.

A. S. T. M. RUBBER NOMENCLATURE.

THE American Society for Testing Materials will hold its annual meeting in Atlantic City, New Jersey, during the week beginning June 25, 1917. In accordance with a resolution passed two years ago, there has been appointed a sub-committee on "Definitions for Rubber Products and Nomenclature of Crude Rubber Varieties," with Dr. Frederic Dannenbush as chairman. This committee will present a preliminary report of its work at the June meeting.

The committee has prepared the following list of terms, and it is desirous of securing criticisms from the technical men of the rubber industry, with special regard to any additions or omissions which should be made.

GROUP I.

Fine Para rubber
Medium Para rubber
Coarse Para rubber
Para rubber
Hevea rubber (wild)
Plantation smoked sheets
Machine smoked sheets
First latex crepe
Brown crepe
Crude rubber
Washed and dried rubber
Refined or broken-down rubber
Deresinated rubber

GROUP II.

Scrap rubber
Reclaimed rubber
Alkali reclaimed rubber
High-grade reclaimed rubber
Floating reclaimed rubber
White substitute
Brown substitute
Rubber resins
Pitch hydrocarbon

GROUP III.

Green stock
Rubber cement
Vulcanized rubber
Backing
Friction compound
Skim ply
Cushion
Bead
Tread

GROUP IV.

Rubber
Rubber hydrocarbon
Synthetic rubber

GROUP V.

Balata
Chicle
Gutta percha
Guayule
Pontianak
Assam rubber
Caucho ball
Castilla rubber
Manicoba rubber
Mangabeira rubber
African rubber

GROUP VI.

(Foreign terms not recommended for American usage.)
Plantation Para rubber
Fine hard cure Para
India rubber
Caoutchouc

The object of the committee in preparing this list of standard terms used in the American rubber industry is to place on record approved definitions for these terms as they are recognized in the American rubber trade, at this time.

The definitions should represent trade usage; should contain no historical matter; should be so clear and concise that they can be used in case of dispute between buyer and seller; should be adopted for use in expert testimony for the courts.

As an example of the value of such standard definitions the committee mentions the case of balata, which is at present imported as rubber (free of duty), while chicle pays a duty of 15 cents and 20 cents. The tendency in such cases is to enter chicle under the name of balata.

NEW JERSEY ZINC CO.'S ANNOUNCEMENT.

The New Jersey Zinc Co., New York City, announces the following prices on Florence brand, French process, zinc oxide, for shipment on contract, during the second three months of 1917:

	Carloads.	Less Carloads.
White Seal	16	16½
Green Seal	15½	15¾
Red Seal	15	15¾

The above prices are based upon shipments in barrels f.o.b. shipping point with freight allowance as heretofore on carload lots only. The above prices are effective April 1, 1917, and are subject to change without notice.

The Composition of Klingerit Steam Packing.

IN connection with the article descriptive of the manufacture of high-pressure steam packing on page 322 of the March 1, 1917, issue of THE INDIA RUBBER WORLD, the following analysis of the composition of Klingerit by André Dubosc in "Le Caoutchouc & la Gutta-Percha" is of interest.

Klingerit is a pasteboard of amianthus (flexible asbestos), formed of a series of thin leaves spread on both sides with an agglutinant having a basis of rubber and balata. These leaves are assembled and when subjected to very powerful pressure in a special calender, give an exceedingly homogeneous pasteboard.

By subjecting the Klingerit, cold, to the action of a suitable inflator, the rubber and balata with which the sides of each leaflet are coated, can be transformed into a non-adhesive jelly which will easily permit the separation, the numbering and the examination of the loose leaves after desiccation in the drying oven at 100 degrees.

A portion was allowed to swell in a mixture of equal parts of sulphuret of carbon and of tetrachloride of carbon. After remaining in this mixture for four hours, the rubber serving as an agglutinant was completely swollen and it was then easy to separate the sheets which composed the pasteboard.

In a sheet of Klingerit board having a thickness of 3.75 millimeters, 15 leaflets, each of a thickness of 25/100 of a millimeter, were then separated.

The cardboard being 3.75 millimeters thick, the composition

$$\left(\frac{25}{100} \times 15 = 3.75 \text{ mm.} \right) \text{ was found to be correct.}$$

The leaves thus separated were subjected to a microscopic examination; they consist of a felting of long amianthus fibers mixed with about 2 per cent of (cellulose) organic fibers, very much elongated, hollow and imperceptibly attenuated at both ends, colorable after washing with methylene blue and ruthenium red—these do not color the amianthus—with thick walls limiting a fairly large cavity and of a generally uniform diameter.

These are flax fibers mixed with amianthus with a view to giving the thin paper of which the leaflet is constituted, a resistance sufficient to endure the process of coating.

Each leaflet is covered on both sides with a reddish solution applied with a spreader and composed of a mixture of rubber and balata to which is added a very small quantity of sulphur, and dissolved in a suitable solvent, benzine or gasoline.

This varnish represents the agglutinant element in the Klingerit joint and owing to the way in which it is applied, it is easily understood that its distribution in the mass is perfect and that it insures complete cohesion of the various thin leaflets which compose the pasteboard. This is in the main composed of an alternating series of very thin leaves of amianthus and flax, 25/100 millimeter thick, held together by very thin layers of a mixture of rubber and balata to the number of 30; each layer is about 5/100 millimeter thick.

Klingerit, as it is put on the market, is not vulcanized, but contains a sufficient amount of sulphur to allow the rubber and balata to vulcanize when the joint is exposed to heat while in place. Thus a perfect resistance and tightness of the system is insured for the leaflets of amianthus cannot then be reached by the liquids that would induce physical decomposition in them. The most important element of this cardboard is the amianthus.

A sample subjected to incineration leaves 80.463 per cent of ash, which cannot be corroded by acids and is composed of large amianthus fibers which preserve their morphological structure entirely. The ash when chemically analyzed, was found to be composed exclusively of the finest commercial quality of long-fiber amianthus.

In order to estimate the quantity of flax cellulose mixed with the amianthus fiber we converted this cellulose into acetate of cellulose, subjecting it to the action of acetic anhydride and of glacial acetic acid together with some drops of sulphuric acid, used as a catalyst. The reaction took four hours, the liquid being maintained at 60 degrees. After filtration on glass-silk, the solution of acetate of cellulose formed was precipitated by a great afflux of water. The acetate was separated by filtration on a tared filter, washed until perfect neutralization was attained, dried in a sulphuric vacuum and weighed; from the weight of the acetate of cellulose considered as a triacetate, the cellulose content was deduced as 2.237 per cent.

The analysis of the agglutinant is more delicate because it is

composed of a mixture of rubber and balata which is rather difficult to separate.

We have observed that if in such mixtures a solvent composed of freshly distilled sulphuret of carbon and 5 per cent of absolute alcohol be used, the rubber dissolves rapidly while the balata remains insoluble; the reaction must take place in a cold state. By evaporating the solvent in a tared vessel, it is possible, for a given weight, to ascertain the amount of rubber contained. This content has been found to equal 5.185 per cent.

The pasteboard resulting from the preceding exhaustion was then treated with chloroform in a warm state in a Soxhlet apparatus until the solvent passed without any coloration.

This exhaustion took 8 hours, the first passages being strongly colored violet.

The chloroform, transferred to a tared vessel, was distilled and the residue of balata which was determined by the usual methods, was weighed after desiccation to constant weight in the sulphuric vacuum.

The balata content was 11.975 per cent.

The agglutinant is therefore composed of:

Balata ...	11.975 per cent	{	17.160 per cent.
Rubber ..	5.185 per cent		

The quantity of sulphur was found, according to the Henriquez method, by disintegrating the board with smoking nitric acid saturated with bromine. A sulphur content of 0.127 per cent was found.

This figure is low, but because of the inflation of the amianthus caused by the nitric acid, it is very difficult to obtain a perfect disintegration, even if large quantities of nitric acid are employed. Another test made with peroxide of sodium, yielded the higher figure of 0.257 for sulphur, which seems more probable.

In constructing Klingerit we advise the use of 5 per cent of sulphur in proportion to the quantity of rubber and balata.

According to these tests the composition of Klingerit resolves itself into:

Amianthus	80.463 per cent	
Cellulose (flax).....	2.237 per cent	
Agglutinant	17.160 per cent	{ Rubber 5.185 per cent
Sulphur	0.127 per cent	{ Balata 11.975 per cent
Water	0.033 per cent	
		100 per cent.

RUBBER IN PLASTIC CEMENTS.

A RECENT review of plastic cements, in "Metallurgical and Chemical Engineering," collects and classifies several of the more valuable formulas and suggestions, gained both from experience and current literature, regarding this class of adhesives. The general methods of plastic cement application, as varied to suit special cases, are stated by the author, J. B. Barnitt, who devotes the following section to rubber:

Because of its toughness, elasticity and resistance to alterative influences, rubber is a very useful cement.

As a leather cement:

(a) Asphalt, 1 part; rosin, 1 part; gutta percha, 4 parts; carbon disulfide, 20 parts.

As a resistant to acid vapors:

(b) Rubber, 1 part; linseed oil, 2 parts; fireclay, 3 parts.

A plain rubber cement:

(c) Cut crude rubber in small pieces and then add carbon disulfide or benzol, allowing the rubber to dissolve.

Corks and wood are made impervious to water by soaking them in the above solution.

The use of rubber in calking cements in conjunction with pitch is also noted:

Plastic cements for calking must be both tough and elastic and have the added property of expanding and contracting with the joint to which they are applied:

(d) Pitch, 3 parts; shellac, 2 parts; pure crude rubber, 1 part.

(e) Pitch, 1 part; shellac, 1 part; rubber substitute, 1 part.

(d) and (e) are mixed by melting over a burner.

Port Sunlight, a Model Industrial Village.

By John Barnard, Architect.

THE movement for the better housing of employes, which is occupying the serious attention of leading minds in the rubber, cotton weaving and other great American industries, had its inception in England several years ago. Such garden villages as Port Sunlight, Bourneville, Hampstead and the like are not without their philanthropic aspects, usually providing home comforts and advantages which the operatives had never known before. But they have proved to be a paying investment to the employer, a factor which several American manufacturers were quick to make the most of.

Many firms that must house their employes have discovered that the cost of doing so well is only a little more than being niggardly in the matter, and that the accruing benefits more than offset the additional investment. But the mere housing, however well it may be done, does not provide the only essential to a full measure of success in such a venture. Community spirit, recreation facilities, educational and other welfare features are also important, particularly in locations somewhat removed from any long-established town or city. Therein lies the principal advantage of the English model industrial village over most of the merely real estate developments for American operatives. The

English tavern, offers good rooms and meals at moderate prices for traveling men and other visitors. The museum contains



A FIVE-FAMILY TYPE OF BRICK.



TWO-FAMILY SEMI-DETACHED HOUSES, ONE OF BRICK AND TIMBER, THE OTHER WITH SLATE WALLS.

inhabitant of such a town enjoys many interests and benefits in common with his neighbors, and in every sense becomes a citizen with the opportunity to take part in the management of village affairs.

Take Port Sunlight, near Liverpool, England, for instance. There, in a setting of delightfully shaded, curving streets, well-kept lawns, ample shrubbery and beautiful flowers, nestle many attractive houses picturesquely grouped and overgrown with ivy. Scattered here and there among them are the community buildings, including a church, inn, school, hospital, museum, social hall, library, swimming pool, playground, gymnasium, stores, etc. The Sunlight Soap Co. also has a bank and coöperative association giving employes an opportunity to save money and buy stock in the company. Flower gardens here and there beautify the picture and provide the outdoor exercise so essential to the health of factory workers, while vegetable gardens, often in tracts of land by themselves divided in squares for the use of separate families, are important factors in reducing the cost of living. Rivalry as to the best gardens is often very keen. Here as elsewhere hedges are usually employed for division lines.

Of the community buildings, the inn, modeled after an old

many fine paintings, pieces of sculpture and furniture which have been donated and is a refining influence in the community. Modern in every respect, the hospital takes care of factory accidents and any sickness in the village. Adjacent to the Gothic church of stone lies the cemetery, after the old English manner.

The dwellings, set well back from the street, are mostly of the semi-detached type, from two to ten in a block, four to six being the usual number. Cheaper labor and materials in England, together with the omission of cellars, have made permanent fireproof construction possible. Coal and wood are stored in a small scullery off the kitchen, and there the laundry work is done.



A SIX-FAMILY TYPE OF BRICK AND STUCCO.

Most of the houses have lower stories of brick with brick party walls, and upper stories of oak framing filled in with brick or terra cotta and plastered with cement. Some, however, have slate-covered walls over a wood frame, while others have stucco exteriors with no timber-work showing. All roofs are of slate.

[This is the second of a series of articles devoted to the better housing of employes.—Editor.]

What the Rubber Chemists Are Doing.

JOINT RUBBER INSULATION COMMITTEE'S SPECIFICATION FOR 30 PER CENT HEVEA RUBBER COMPOUND (CHEMICAL CLAUSES).

THE following specifications and explanations are from the report of the Joint Rubber Insulation Committee, published in full in "The Journal of Industrial and Chemical Engineering" (March, 1917). The analytic procedure was outlined in THE INDIA RUBBER WORLD (November 1, 1916).

SPECIFICATION.

1. A 30 per cent fine Para or best quality plantation *Hevea* rubber compound with mineral fillers shall be furnished. It shall contain only the following ingredients: (1) rubber; (2) sulphur; (3) inorganic mineral matter; (4) refined solid paraffin or ceresin.

2. The vulcanized compound shall conform to the following requirements, when tested by the procedure of the Joint Rubber Insulation Committee, results being expressed as percentages by weight of the whole sample.

REQUIREMENTS INDEPENDENT OF THE AMOUNT OF RUBBER FOUND.

	Maximum.	Minimum.
Rubber	33	30
Waxy hydrocarbons	4	..
Free sulphur	0.7	..

Red lead, carbon, or organic fillers shall not be present.

REQUIREMENTS DEPENDENT UPON AMOUNT OF RUBBER FOUND.

(Requirements for intermediate percentages shall be in proportion to the percentage of rubber found.)

	30 PER CENT RUBBER COMPOUND.		33 PER CENT. RUBBER COMPOUND.	
	Maximum.	Minimum.	Maximum.	Minimum.
Saponifiable acetone extract..	1.35	0.55	1.50	0.60
Unsaponifiable resins	0.45	...	0.50	...
Chloroform extract	0.90	...	1.00	...
Alcoholic potash extract.....	0.55	...	0.60	...
Total sulphur (Note 2).....	2.10	...	2.30	...
Specific gravity .....	...	1.75	...	1.67

3. The acetone solution shall not fluoresce.
4. The acetone extract (60 cc.) shall be not darker than a light straw color.
5. Hydrocarbons shall be solid, waxy and not darker than a light brown.
6. Chloroform extract (60 cc.) shall be not darker than a straw color.
7. Failure to meet any requirement of this specification will be considered sufficient cause for rejection.
8. Contamination of the compound, such as by the use of impregnated tapes, will not excuse the manufacturer from conforming to this specification.

NOTE 1. This specification shall be supplemented by appropriate clauses relating to tensile strength, elasticity, electric insulation resistance and dielectric strength. (See the Wire and Cable Specifications of the American Society for Testing Materials, the Association of Railway Electrical Engineers, etc., for examples of such clauses.)

NOTE 2. The limit on total sulphur may be omitted at the option of the purchaser.

EXPLANATION OF SPECIFICATION.

Experience has shown that compounds of the grade which contains only good *Hevea* rubber, may be relied upon to be more permanent than those made of rubber of other grades. It is not affirmed by the committee that a compound which conforms with this specification is necessarily permanent, or that a better compound cannot be made, but it is believed that enforcement of the specification will limit the use of inferior materials and that it will put the manufacturers more nearly upon equality of endeavor, where they can use their experience to obtain the best

results. Used in connection with the analytic procedure, the specification will enable purchasers to order a good compound and to ascertain, with a greater certainty than heretofore, whether the material received represents the compound specified.

The term *Hevea* applied to rubber means rubber from the *Hevea Brasiliensis* tree, whether wild or cultivated and regardless of the locality in which it has been grown. Para rubber is *Hevea* rubber of the kind originally shipped from the port of Para, Brazil, and comes in several grades. The rubber required by this specification should be *Hevea* rubber of good quality, such as fine Para or best quality plantation rubber.

Carbon is excluded, not only because it is considered, by some purchasers, to be deleterious, but because it interferes with the determination of rubber hydrocarbons.

Red lead is excluded because of the possibilities of its deleterious effects on rubber.

Ozokerite is prohibited because the acetone extract obtainable from it interferes with the separation of the acetone extract obtainable from the rubber, thereby vitiating the assay of the rubber extract. This prohibition is unimportant to the manufacturers, as ceresin, which is permitted, is the essential constituent of ozokerite.

An upper limit is placed upon the rubber in order to prevent the attainment of electrical and mechanical strength by the use of an extra quantity of inferior rubber whose lasting qualities might not be satisfactory.

The hydrocarbons are limited, owing to their tendency to separate from the compound and thus cause porosity.

The free sulphur is limited because an excessive amount may be deleterious.

The maximum limit on the saponifiable acetone extract is to prevent the use of raw or reclaimed rubber with high saponifiable extract. The medium limit assists in forcing the use of *Hevea* rubber, since it is characteristic of the acetone extract from *Hevea* to be largely saponifiable.

The unsaponifiable resins are limited because a low proportion of unsaponifiable resins is characteristic of *Hevea* rubber. A high result might be due to the presence of reclaimed rubber.

The chloroform extract is limited, first to prevent the use of bituminous substances, and, second, to limit depolymerized and under-cured rubber.

The alcoholic potash extract is limited to prevent the use of saponifiable rubber substitutes.

The specific gravity is limited to reconcile the specification of ingredients by weight with the practice of purchasing material by volume.

Fluorescence of the acetone solution is prohibited, as it indicates the presence of bituminous substances, rosin oil or mineral oils.

The color of the acetone extracts is specified to conform with the normal color of the extract of *Hevea* rubber. A darker color indicates adulteration or an inferior grade of rubber.

The hydrocarbons are required to be solid in order to prevent the use of oils and paraffin of low melting point. The shade required is that obtained from paraffin wax or ceresin. Liquid hydrocarbons indicate reclaimed rubber softened with mineral oil, or paraffin of low melting point.

The color of the chloroform extract is specified to conform with the color of dissolved gum in small quantities. The presence of bituminous substances would be indicated by a brown or black color.

It would be desirable that the sulphur of vulcanization be limited to exclude reclaimed rubber, which contains the sulphur of its previous vulcanization, but the committee has not yet developed an acceptable method for determining this quantity. It

is, therefore, confronted with the choice of either placing a limit on the total sulphur or giving up the attempt to exclude shoddy by sulphur limitation. Option is, therefore, given to the purchaser to insert or omit the limit on total sulphur. Such insertion will at times exclude reclaimed rubber and the committee believes it possible to make a suitable compound with this limitation. The committee thinks that a sulphur limit positively excluding reclaimed rubber, would place too great a hardship, in other ways, on the manufacturers. Where the specification is used with no total sulphur limit, the use of many kinds of, or much reclaimed rubber, will be guarded against by the limits of the various components of the acetone extract. When the limitation on total sulphur is omitted, sulphur-bearing fillers, which possess certain advantages, may be used.

This specification should be supplemented by appropriate elasticity and tensile strength tests, in order to add to the assurance that good rubber has been used and that the vulcanization process has been properly carried out; also by appropriate electric stress and resistance tests, to assure proper insulating qualities and homogeneity of structure. The exact value of the limits for these tests will depend upon the use to which the material is to be put.

IMPORTANT SPECIFICATIONS CONTAINING THE JOINT RUBBER INSULATION COMMITTEE'S CHEMICAL CLAUSES OR ANALYTICAL PROCEDURE.

AMERICAN ELECTRIC RAILWAY (ENGINEERING) ASSOCIATION: Standard Specification for Rubber Insulated Wire and Cable.

AMERICAN SOCIETY FOR TESTING MATERIALS: Proposed specifications for Insulated Wire and Cable; 30 per cent *Hevea* Rubber.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS: Standard Specifications for Wire and Cable.

INTERBOROUGH RAPID TRANSIT CO., MOTIVE POWER DEPARTMENT, NEW YORK: Specification No. 2.

NEW YORK CENTRAL RAILROAD CO., ELECTRICAL DEPARTMENT: Specification No. 300.

PANAMA CANAL: Office of General Purchasing Agent, Circular No. 1,038.

SIGNAL CORPS, U. S. ARMY: General Specification No. 581-A, etc.

ALUMINUM NAPHTHENATES.

The properties and method of obtaining aluminum naphthenate is described by G. Nothe in "Le Caoutchouc & La Gutta Percha" (November, 1916). Pure naphthenic acid from Baku petroleum, when treated with alumina, yields aluminum naphthenate, which, according to the method employed, may be a powder or a colloidal mass, very elastic and plastic, not unlike factis. The material is used in rubber mixings and vulcanizes readily. German pneumatic tire manufacturers largely use such a naphthenate manufactured by the E. de Haën Co. Aluminum naphthenate is nearly insoluble in acetone, and gives with chlorides of hydrocarbons very viscous colloidal solutions forming transparent films of great strength. By using a sufficient quantity of solvent the gel which first forms, gives, on gentle heating, faintly yellowish fluid solutions, miscible in all proportions with cellulose acetate producing strong films. The Germans have utilized this material in large quantities as a substitute for rubber, mixed with reclaimed rubber in the manufacture of pneumatic tires during the war.

CEARA RUBBER FROM NIGERIA.

Two samples of Ceara rubber are reported by the Bulletin of the Imperial Institute (1916, volume 14, pages 382-384). These samples were rough sheets prepared from latex tapped by the Lewa system from trees growing in the government plantation at Ankpa, Bassa, Northern Provinces, Nigeria. The physical properties of the samples were satisfactory and the analytical results showed loss on washing: 5.3 and 8.0 per cent on original sample; and caoutchouc, 83.1 and 84.7; resins, 5.3 and 6.3; protein, 9.9 and 7.7; ash, 1.7 and 1.3 on the dry-

washed rubber. A comparison of the second sample with plantation Para sheet, with regard to their behavior on vulcanization gave the following results: Time of cure at 50 pounds steam pressure, Ceara 50 minutes, Para sheet 70 minutes; tensile strength 2,330, 2,300-2,400 pounds per square inch; elongation 847-875 per cent. The ages of the trees from which the two samples were obtained were, respectively, three years and three to four years, their average girth being 15 inches and 18 to 20 inches at three feet from the ground. [Journal Society of Chemical Industry, January 31, 1916.]

FREE AND COMBINED SULPHUR IN VULCANIZED RUBBER.

B. J. Eaton and F. W. F. Day in "The Journal of the Society of Chemical Industry" (January 15, 1917), recount their research on a "Preliminary Investigation on the Estimation of Free and Combined Sulphur in Vulcanized Rubber, and the Rate of Combination of Sulphur with Different Types of Plantation Para Rubber." They found it necessary to devise a special method for sulphur determination in vulcanized rubber. After protracted acetone extraction, combustion of the extracted rubber is effected in oxygen under special conditions. The authors state that the combustion method described would be inadmissible for estimating sulphur in vulcanized mineral mixings, although it enables them to balance the free sulphur and the combined sulphur against the total sulphur and against the original sulphur put into the mixing investigated. This mixing was 90 per cent rubber and 10 per cent sulphur. Three types of rubber were investigated, namely slab, sheet and crêpe. All of these samples were prepared from similar latex and under identical conditions except as to machining. It was concluded that "the percentage of combined sulphur at the optimum time of cure is practically the same for all three types, and this percentage of sulphur at the optimum time of cure is always about 4 to 4.5 per cent, calculated on the mixing. Whether this will be so for all samples remains to be seen."

CHEMICAL PATENTS.

INSULATING COMPOSITION. Phenol condensation compound and solvent. Leo H. Bakeland, Yonkers, New York, assignor to General Bakelite Co., New York City. [United States patents Nos. 1,216,265 and 1,216,266.]

RUBBER COMPOSITION AND PROCESS. The process of making rubber compositions which comprises working together rubber, a dry sulphite waste liquor preparation, a composition of blown petroleum and asphalt, and other body-giving components. [Michael F. Coughlin, Boston, Massachusetts, assignor to American Gum Products Co., Covington, Virginia. United States patent No. 1,217,157.]

SHOE FILLER COMPOSITION. A filling material for shoes comprising a solution of rubber in a solvent, comminuted cork, carbon tetrachloride, and sulphur, the proportions being such that the resulting mixture is plastic and adapted to vulcanize quickly when spread on the bottom of the insole of a shoe. [Adam H. Prenzel, Halifax, Pennsylvania, assignor to United Shoe Machinery Co., Paterson, New Jersey. United States patent No. 1,217,214.]

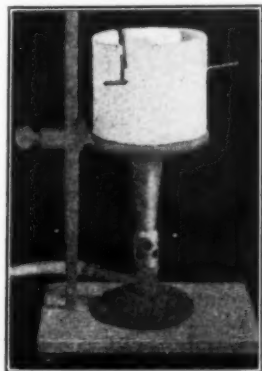
CAOUTCHOUC-LIKE MATERIAL. A caoutchouc-like body resulting from the reaction caused by adding dichloride of sulphur to a mixture containing a ketone capable of yielding isoprene and caoutchouc. [Herman Stern, Munich, Germany, United States patent No. 1,218,713.]

METHOD OF IMPREGNATING FABRICS. Fabrics are treated with a preparation made by mixing rubber, sulphonated castor oil and sulphur. The treated fabric is dried and finally vulcanized. [Lauritz Peterson-Hviid, Copenhagen, Denmark. United States patent No. 1,219,349.]

LABORATORY APPARATUS.**MEASURING STRETCH OF RUBBER. TEST SAMPLES.**

THE ordinary testing machine is provided with a pair of hand-adjustable pointers, movable on a measuring scale for determining stretch. The operator, with or without assistance, endeavors with these pointers to follow the movement of the reference marks on the rubber sample under test. This method leaves much to be desired as to convenience and accuracy. The following substitute has been found entirely satisfactory. The instrument required consists of a pair of hard wood dividers, made by fastening together, with a quarter-inch screw bolt and thumb nut, two strips of wood $\frac{3}{4}$ inch thick, 1 inch wide and 18 inches long. The bolt should be located about 4 inches from one end. The opposite arms are tapered together to a chisel edge. To use the instrument the operator holds it by one short arm, with the right hand, placing the thin edge of the corresponding long arms on the upper reference mark of sample. Without further attention the instrument moves downward with the upper line as the sample is stretched. The operator follows the progress

of the lower reference mark, opening the dividers with the left hand, keeping contact with the line until the sample breaks. Having to follow but one mark, the operator can do it easily and accurately. The final spread of the dividers, less the original distance apart of the reference marks, gives the actual stretch, which should be recorded in terms of percentage on length of the marked interval.

**ALUNDUM FLAME COLLAR.**

This piece of apparatus is designed to produce uniform conditions of intense heat for igniting in alundum or platinum crucibles. These collars are made to withstand wide variations of temperature. [Norton Co., Worcester, Massachusetts.]

METHODS OF TEST.

THE physical testing of rubber materials as specified by the Board of Estimate and Apportionment, of New York City, reported in the March number of THE INDIA RUBBER WORLD, is continued as follows:

DETERMINATION OF FRICTION OR ADHESION STRENGTH.

The determination of friction or adhesion strength between the rubber and the fabric, or between the layers of fabric, shall be made as follows:

APPARATUS. All friction or adhesion strength tests shall be made on the tensile testing machine.

RUBBER HOSE AND CIRCULAR TEST PIECES.

All rubber hose and other wrapped circular test pieces shall be slipped on a mandrel one-eighth inch wider than the test piece and of the same diameter as the inside of the hose.

The mandrel with the test piece in place shall be slipped on the pin attached to the power head.

The free end of the test piece shall be clamped to the lower head of the testing machine without twisting and centered over the mandrel.

The weight clutches shall be raised and the machine started at the uniform rate of one inch per minute.

After separation commences the load shall be constantly watched to see that it does not at any time fall below the specification requirement.

On the Schopper machine this load shall be recorded on the automatic recording device.

The entire friction layer or layers shall be separated.

COTTON RUBBER-LINED FIRE HOSE.

Cotton rubber-lined fire hose test pieces and test pieces of a similar character shall be tested exactly as prescribed in the foregoing under "Rubber Hose and Circular Test Pieces," except that the fabric shall be fastened to the power head with a clamp instead of a mandrel.

PACKING AND OTHER FLAT TEST PIECES.

Packing and other flat test pieces shall be tested exactly as prescribed for rubber hose, except that a clamp instead of a mandrel shall be used, and either the fabric or the rubber shall be fastened to the lever head according to the thickness of the rubber.

If the rubber is not thicker than one-eighth inch the fabric shall be fastened to the lever head.

If the rubber is thicker than one-eighth inch the rubber shall be fastened to the lever head.

When fabric and fabric are to be separated, the heavier shall always be fastened to the lower head.

When heavy materials like belting are to be tested, the test pieces shall consist of not more than two plies of the fabric for any one test.

DRY HEAT TEST.

The test pieces prepared and measured beforehand are placed in a hot-air oven at the specified temperature for the specified time, cooled to room temperature, the tensile strength and elongation tests made, compared with the untreated specimen, and the reduction calculated to the nearest tenth per cent.

GASOLENE TEST.

Tube and cover test pieces for the gasolene test shall be cut, prepared and measured as specified under preparation of tensile strength. Test pieces shall be completely immersed in 57- to 63-degree Baumé gasolene for a period of 48 hours at a temperature between 60 and 80 degrees F. They shall then be removed, allowed to rest and freely evaporate in air at the same temperature for 24 hours. The tensile strength and elongation tests shall then be made, compared with the untreated specimens and the reductions calculated to the nearest tenth per cent.

Friction strength test pieces shall be made on a one-inch specimen cut for the mandrel test. After treatment with gasolene, as outlined above, the friction strength shall be determined, compared with the untreated specimen, and the reduction calculated to the nearest tenth per cent.

STEAM TEST.

The determination of steam resistance of hose shall be made by connecting three-foot lengths to a steam supply pipe and maintaining the pressure required in the specification for the period called for. The tensile strength elongation and friction strength tests shall be made on the specimens cut, prepared and measured after the steam test, compared with the untreated specimens and the reduction calculated to the nearest tenth per cent.

DETERMINATION OF POROSITY IN AIR HOSE.

The length selected for test shall be subjected to 140 pounds air pressure. The cover shall then be cut lengthwise with the hose for at least two feet. The pressure shall be maintained for five minutes. At the end of this period the length, still under pressure, shall be submerged in water. If there is a distinct escape of air which is not due to the air confined in the structure of the walls, the hose shall be considered porous.

DETERMINATION OF BURSTING OR PROOF PRESSURE.

The determination of bursting or proof pressure shall be made in the following manner:

The hose shall be stretched out on a plane surface in a straight line, connected to the water line or pump and filled with

water, leaving the air-cock open to allow the air to escape. The air-cock shall then be closed and a pressure of ten pounds per square inch applied.

The test shall then begin by taking original measurements with the pressure at 10 pounds.

Pressure tests shall be measured with a standardized gage. The increase in pressure shall be made at the rate of 100 pounds per minute and the hose under test shall be held for measurement not more than two minutes.

The unit specification may sometimes modify the foregoing procedure in regard to the pressure at which measurements are to be taken and the period of time to hold pressure while measurements are being made, in which case the procedure as stated in the unit specification shall be followed.

When called for in the specifications hose shall be subjected to bursting pressure when laid out straight, when curved in a circle of 27 inches radius and when kinked short off.

When the hose is bent flat on itself with a sharp kink and securely fastened in that position for the kink test, the distance from the tail piece of the coupling to the kink shall be according to size and kind as follows:

Kind and Size.	Distance to Kink.
1½-inch fabric and rubber hose.....	15 inches.
2½- and 3-inch fabric hose.....	18 inches.
2½- and 3-inch rubber hose.....	24 inches.

EXPERIMENTS ON THE REMOVAL OF COMBINED SULPHUR FROM REGENERATED RUBBER.

By D. Repony.

CONSIDERING the numerous patents issued for processes of reclaiming rubber scrap, there are a large number of rubber chemists, and many others, who are trying to regenerate vulcanized rubber with the object of removing the combined sulphur.

It is not my intention to criticise the value or worthlessness of the average patented process, yet it is not unjust to maintain that the above problem is yet unsolved.

Moreover, it is not my object to describe how this can be accomplished. My intention is merely to give to the readers of THE INDIA RUBBER WORLD my experimenting experience on this problem, with the hope that it may be of value.

Regarding the solubility of vulcanized rubber, when it is passed in solution by boiling with kerosene, etherical camphor oil, oils, liquid tars, nitrobenzol, turpentine, salol, etc., the solubility is more affected by the heat employed than by the solvent.

Under the temperature 130 degrees C. the solution is very slowly obtained, and above 190 degrees C. it is readily obtained, while heating above 200 degrees C. partially decomposes the rubber.

Vulcanized rubber in such solution is not affected in its chemical composition, nor with reference to its combined sulphur.

EXPERIMENTS.

1. Common reclaimed rubber intermixed with powdered caustic soda and subjected to steam heat in the autoclave from 140 to 170 degrees C. for a period of 5 to 12 hours.

2. Just as above, but intermixed with lead filings.

3. Intermixed with lead acetate.

4. Intermixed with iron filings.

5. Vulcanized rubber (auto tires) broken down in smaller pieces and brought in solution with linseed oil at a temperature of 180 degrees C., is poured in boiling 30 per cent caustic soda. The linseed oil becomes saponified and the rubber completely reprecipitated.

None of the above treatments has removed any of the combined sulphur nor improved the product in any way. Of course, the two treatments with caustic soda have removed all the free sulphur, but this I do not consider as an advantage. Liquid tar has great affinity to combine with sulphur, evolving it as H₂S.

6. Vulcanized rubber pieces immersed in liquid tar and ex-

posed in an autoclave to a temperature of 150 degrees C., after 8 hours, will assume the form of heavy cement. This product was afterwards treated with a mixture of benzol and alcohol to effect the separation of the rubber. This resultant product, after analysis, proved to contain all the combined sulphur previously present.

7. Repeated above experiment, with the exception that it was boiled on a hot iron plate so that the product was not exposed to any external pressure that would hinder the formation of H₂S gas. No better result was obtained, however.

EXPERIMENTS WITH NASCENT HYDROGEN.

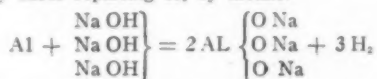
8. Vulcanized rubber was brought in solution with kerosene, mixed with zinc dust, to which was added dilute hydrochloric acid. Upon stirring and boiling this mixture a large amount of hydrogen sulphide was evolved. Repeated this experiment on rubber free of free sulphur and sulphides, but the same reaction took place. After the treatment the kerosene was extracted with alcohol and refined by means of alcohol and finally washed with water. The obtained product analyzed, showed that some combined sulphur was removed, but in its place was substituted chlorine, and the rubber was badly influenced by the acid. Moreover, this product gave a very poor physical test for reclaimed rubber.

9. Repeating above experiment by substituting dilute sulphuric acid in the place of hydrochloric acid, no hydrogen sulphide was evolved, but the rubber was not in any manner changed.

10. Repeating the same experiment with a solution of oxalic acid, the result was the same as with sulphuric acid.

11. Repeating again the same experiment using dilute acetic acid, and in another case highly diluted nitric acid; in both cases the rubber was oxidized to a powdery substance.

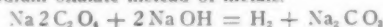
12. Other experiments with nascent hydrogen, the latter being produced by bases replacing H₂ by metals.



Aluminum dust admixed to high grade reclaimed rubber, and rolled out to thin sheets, the latter being immersed in strong, boiling Na OH solution, the reaction takes place vigorously. Of course, in this case the evolution of H₂S cannot be expected. Analysis of this product proves that no part of the combined sulphur has been removed.

13. Repeated the same procedure as above, but instead of aluminum dust, zinc dust was used.

14. Again employed the same reaction with nascent hydrogen by using sodium oxalate instead of metals.



In the two last experiments the reaction was accomplished vigorously, but in no case was the combined sulphur removed, and the obtained product has shown all the same properties that it possessed originally as common reclaimed rubber.

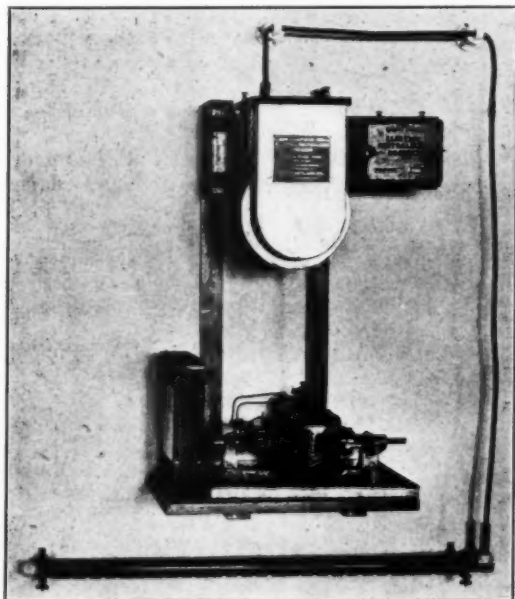
15. One pound of metallic sodium thoroughly mixed with 8 pounds of high grade reclaimed rubber became hot within a half minute after being removed from the mixing rollers. This is partly due to the moisture present in the reclaimed rubber, and partly to the rapid absorption of moisture from the atmosphere. The reaction was so rapid that before I was able to plunge it in boiling water a part of it had ignited. Yet I was able to obtain a large enough sample, which had been subjected to the proper reaction and not burned. Examination proved that by this treatment nothing had been gained; however, nothing had been spoiled.

Among all these experiments doubtless the reaction of nascent hydrogen developed from zinc dust and dilute hydrochloric acid, substituting chlorine for the combined sulphur, is the only interesting one, and may serve as basis for further research work on this difficult problem.

New Machines and Appliances.

THE CHAPMAN NEUTRALIZER.

IT is claimed that the elimination of fire risk in rubber mills due to static sparks, imminent in the operation of spreaders, cement churns and other machines where naphtha is used, may be accomplished by the apparatus shown in the accompanying illustration. It comprises an electric transformer located on some convenient wall and connected by heavily insulated wires to the inductor bars that are attached to the machines to be protected. Briefly stated, the principle is as follows: A direct static charge spontaneously selects from a neighboring



alternating charge the exact quantity and kind to neutralize it. The charge in the material may be positive, or it may be negative, it makes no difference, for the alternating charge has both kinds to select from. The choice is unwavering as Nature's law, and the result is perfect neutralization.

The alternating charge is distributed to the charged material by means of a bar called the inductor placed near the material. The air around the inductor for a distance of a few inches becomes filled with positive and negative charges which are entirely imperceptible to the senses, but which are extremely forceful in killing any other charges that come within the field of their influence.

In the application of this device to a spreading machine, two inductors, extending across the machine and over the fabric, are usually recommended. One is placed just back of the spreading knife and the other is located near the point where the proofed fabric is wound up.

These inductors are placed so that the fabric passes them at a distance of from two to four inches. The influence of the inductors extends through the air for several inches around them, and every portion of the fabric as fast as it comes within this region of influence is imperceptibly but instantly deprived of any electric charge. The result of this action is that the inductor at the head end of the spreader instantly and completely neutralizes every part of the fabric as fast as it leaves the spreading knife, before any charge imparted to the fabric can accumulate sufficiently to discharge to the roll, knife, frame

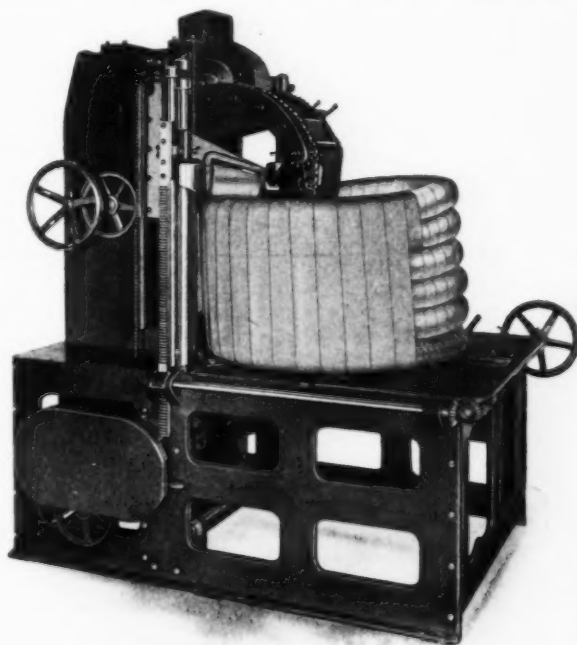
or pipes in the form of a spark. The object of the other inductor, treating the fabric just before it is rolled up, is to remove any slight charge redeveloped by the other rolls over which the fabric passes before winding up.

When successive coatings are being applied, it is often necessary to place an inductor near the unwinding roll and on the under side of the web as it is unrolling. This inductor is mounted on a hinged frame having a roller resting on the roll of cloth, thus keeping the inductor always in the most effective position whether the roll of cloth is large or small. After the cloth has received two or three coatings it is quite likely to generate considerable electricity at the point of separation of the web from the unwinding roll, the web assuming a negative charge and the roll a positive charge, and an inductor so placed will instantly and completely neutralize both charges at the same time. Recent installations have proved that this is the most effective position for an inductor on a spreading machine. [The Chapman Electric Neutralizer Co., Portland, Maine.]

THE T. & W. TIRE WRAPPING MACHINE.

A tire packaging machine that is guaranteed by the makers to wrap at least 50 bundles per hour and make a tight, compact, evenly wrapped bundle, is here shown. It will wrap bundles 36 inches high, if desired, with paper or burlap, the tires being all of the same size or of different sizes as the case may be.

The machine is operated as follows: A roll 20 inches in diameter and 6 inches wide is placed between two endless chains,



of the noiseless type, and is carried down through the inside of the bale and upward around the outside of the bale, thus wrapping the strip of burlap or paper around the bale as it is rotated by the revolving cones upon which it rests. Two other revolving cones over the bale are so arranged that by turning

a hand wheel they are made to bear down on the bale to any degree of pressure required, insuring an even rotation and tight wrapping. The overlapping is evenly done, the width of the overlap can be easily regulated, and changing from the wrapped bale to the next one to be wrapped is instantaneous.

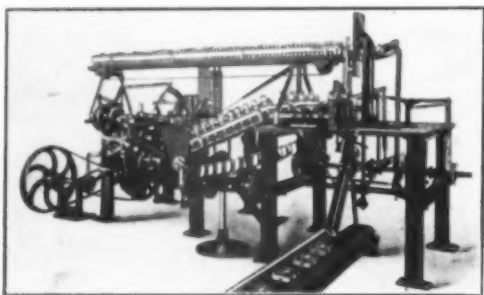
The machine occupies a space 6 feet by 6 feet, by 7 feet high, and requires $2\frac{1}{2}$ horse power to drive it. Motor drive is furnished if desired. [Terkelsen & Wennberg, Boston, Massachusetts.]

THE WILLS CARTON ERECTING AND FILLING MACHINE.

An extremely light-running, accurate, and rapid machine for cartoning goods in what are called tucked cartons such as are used for boxing rubber heels, fruit jar rings, etc., is the subject of the following illustrated description.

The equipment consists of two units, a carton erecting machine, and a carton filling machine, coupled together and synchronized; all being operated by a $\frac{1}{4}$ horse-power motor. It will handle articles in multiples as well as units. For instance, it can be built to count fruit jar rings into dozens, or will put two heels and a package of nails into each box.

The cartons are placed in a stack, flat or collapsed as they come from the maker, and the articles to be packed are placed on a carrier belt. The machinery erects the carton, closes the bottom, inserts the contents, closes the top, counts the carton, and sends it off on another carrier belt, a complete, symmetrical



package. The speed of this machine depends somewhat on the article packed, but usually runs about 40 packages per minute.

The entire equipment with electric motor and counting device, complete and ready for use, is made to order in accordance with the special requirements of each case. [Arthur J. Wills, North Brookfield, Massachusetts.]

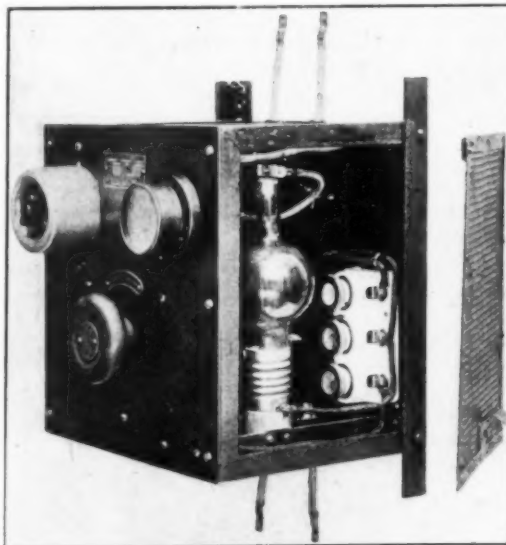
TUNGAR RECTIFIER FOR GARAGES AND SERVICE STATIONS.

To meet the demand for a device that will transform the 115-volt, 60-cycle alternating current supplied to many garages and service stations into direct current suitable for recharging automobile storage batteries, the General Electric Co., of Schenectady, New York, has developed a type of "Tungar" Rectifier of 6 amperes, 75-volts capacity that will charge from one to three storage batteries at a time.

A compensator with 15 taps is attached and a dial switch for adjusting the voltage according to the number of batteries to be charged. The current is instantly adjustable in steps up to six amperes.

After the two upper wires are connected to the alternating current supply and the direct current leads coming out of the bottom of the rectifier are connected to the batteries, which should be connected in series, turning the alternating current switch will start the rectifier charging and without shaking. If the alternating current should fail, the batteries cannot discharge through the rectifier and will start recharging when the current comes on again. Charging costs about 9 cents per 3-cell battery for about a 13-hour charge when groups of ten are charged and about 12 cents per 3-cell battery when charged in groups of

five. The efficiency of the rectifier increases and recharging costs per battery are lowered as the number of batteries on charge is



increased toward the 30-cell, maximum capacity of this type "Tungar."

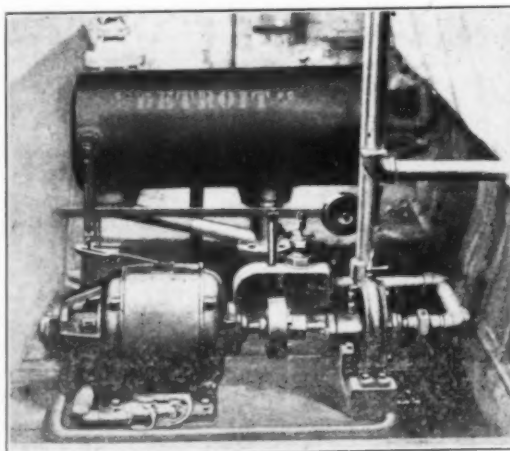
The entire apparatus, including all live parts, is enclosed in a perforated, japanned finish, sheet iron casing. [The General Electric Co., Schenectady, New York.]

A NEW ELECTRICAL PUMP UNIT.

A novel combination of condensation trap, electric motor and centrifugal pump is shown in the following illustration. The application of this unit to a line of heaters for automatically discharging the water of condensation into a hot-well, low-pressure boiler or feed-water heater, appears to be quite practical where the radiation is below the water line.

The unit is placed below the radiator and the condensation flows into the trap by gravity, the air being taken care of by the air vent and an automatic air valve.

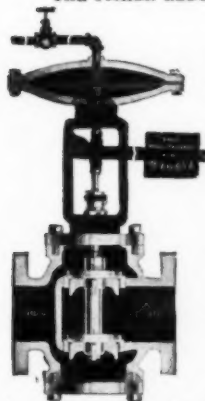
As the trap fills it tilts downward and remains in this position as long as there is any water in the system. In tilting



downward, it throws in a snap switch, starting the motor that is directly connected to the centrifugal pump, and the accumulated water is discharged into the hot-well boiler or feed-water heater.

When the trap is empty it returns to its normal position, at the same time operating the switch that stops the motor and pump. When the trap again fills, the operation of discharging as previously described is automatically repeated. [The American Blower Co., Detroit, Michigan.]

THE FISHER REDUCING VALVE OR PRESSURE REGULATOR.



Steam pressure regulators are of such importance in the modern rubber mill that the following description of a standard type of reducing valve will be of interest:

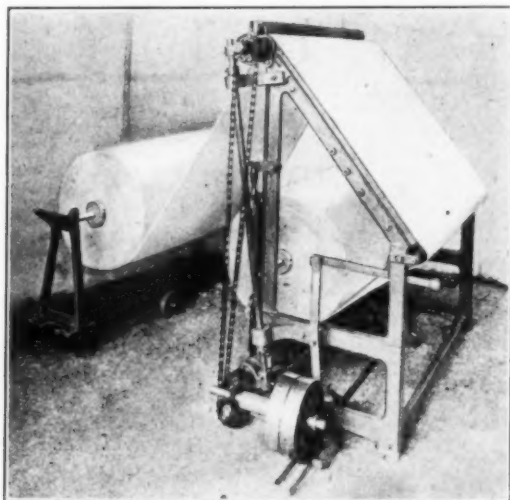
The diaphragm-actuated type of valve, controlled by lever and weight, has for years been accepted by engineers due to its simplicity and positive action. The illustration is that of a valve particularly adapted to low-pressure service, but the type of construction permits the use of different sizes of diaphragms, making it suitable for various pressures.

The valve bodies are iron, except smaller sizes, which are bronze, and the inner valve is a semi-balanced, double-seated type with beveled seats and seat rings ground in and tested under practically the same pressure and temperature that the valve would be subjected to while in operation. This valve will operate with a comparatively small weight and does not require a dash pot as would be the case with a single-seated valve. All valves and seat rings are cast from hard phosphor bronze and the stems are all made from Tobin bronze rods.

In operation the inner valve is normally held by lever and weight. The volume of pressure passing through the valve builds up within the low pressure main and enters the diaphragm chamber through the controlling pipe line. When the low pressure reaches the desired point, a balance is formed with lever and weight, and thus the valve opening is regulated according to the steam consumption and the determined amount of low pressure maintained. [The Fisher Governor Co., Marshalltown, Iowa.]

FABRIC INSPECTION MACHINE.

All fabrics used in the manufacture of rubber goods are carefully inspected. It is, in fact, the first step in their preparation



for calendaring or spreading. Every inch of fabric is closely scanned to detect defects in the weave and imperfections in the

finish of the goods. The fabric inspection machine here illustrated is one of the newest types, and therefore of interest.

The roll of fabric comes to the machine on a truck and the end is threaded from the back of the machine between the weight roller and top draft roller above the desk, down to the winding roller in the wind-up attachment. The operator sits in front with foot on the treadle which automatically assumes a neutral position by means of springs. The pressure of the foot forward starts the cloth down the table, and removal of pressure stops the cloth, while pressure on the heel of the treadle reverses the cloth, feeding it up the table.

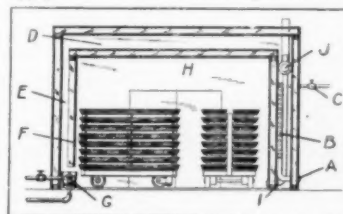
The horizontal lever shown at the left of the table shifts the belt on the tight and loose pulleys. The power drive shown on the left side of the machine may be mounted on the right hand side so that the machine can be put on either the right or left side of the room and the drive come next to the wall.

The rolling attachment back of the table holds the winding rollers in position with latched levers that can be readily thrown back and the roll of fabric quickly removed. [Parks & Woolson Machine Co., Springfield, Vermont.]

MACHINERY PATENTS.

THE HUNTER DRY KILN.

ACCORDING to this process, the rubber is exposed in humid air that is kept in circulation and provided with a continuous supply of fresh air. The temperature in the dry room is raised as



high as 160 to 170 degrees F. and the rubber dried in 12 to 14 hours. It is claimed that rubber treated by this process, whether it has been previously dried or not, is of a better quality than dried in the usual way.

A cross-section of the dryer is here shown. The air enters at A and rises, passing over the steam coils B supplied from pipe C. The heated air then passes through the upper chamber D and downward into the compartment E where the air is deflected downward by the partition F and passes over the humidifier G, into the rubber treating chamber H. From here the air passes out of the dryer through pipe I and header J to the atmosphere, thus creating a constant circulation.

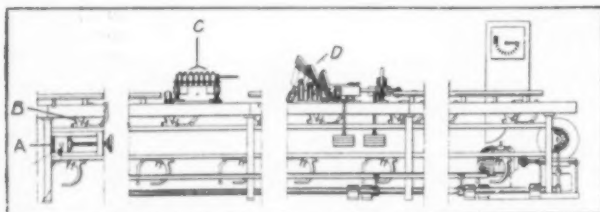
As the air passes over the surface of the water in the humidifier a certain amount of evaporation takes place, depending on the temperature of the water and the humidity of the air. The quantity and temperature of the water supply is automatically controlled so that the air entering the treating chamber is of uniform humidity. The best results are produced most quickly with an air temperature of 140 to 160 degrees F. and a relative humidity of 30 to 35 per cent.

The long trays containing the rubber to be dried are placed on special trucks and are rolled into the dry room, and it is claimed the relatively moist air and the relatively high temperature produces dried rubber of superior quality in a comparatively short time. [Harry Hunter, assignor to The Hunter Dry Kiln Co.—both of Indianapolis, Indiana. United States patent No. 1,218,261.]

FOOTWEAR ROLLING MACHINE.

The object of this invention is a machine for making rubber-soled footwear irrespective of the construction of the uppers. The illustration is a broken side elevation of the machine and A is an endless motor drawn chain conveyor to which are attached the last holders B. The lining, the inner sole, and a toe-strip are applied to the last, the latter overlapping the lining and inner sole. A rag sole is then applied lengthwise of the bottom of the last, overlap-

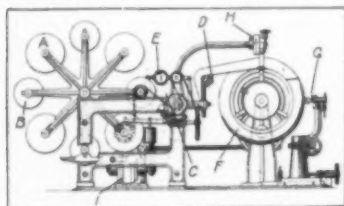
ping the inturned edge of the toe-strip. The last is then placed on the conveyor and the rag sole, the inner sole and the inturned edge of the toe-strip are rolled down together by the mechanism C. The last is then removed from the conveyor and the counter, heel-piece, vamp, quarter and outer filler or sole piece are applied, the last replaced on the conveyor and the parts rolled down by a mechanism not shown. The toe and heel foxing are then applied



and rolled by a mechanism similar to C, when the outer sole is applied and the edges rolled into close contact with the foxings, by a mechanism not shown, the final set or rollers D completing the operation. [Myron H. Clark, Malden, Massachusetts, assignor to The Goodyear's Metallic Rubber Shoe Co., Naugatuck, Connecticut. United States patent No. 1,218,983.]

KREMER'S TIRE BUILDING MACHINE.

The principal object of this invention is to provide a tire shoe making machine that will shape or stretch the longitudinal, median portions of the fabric without stretching the edges in a corresponding manner.



The following briefly describes the operation of the machine shown herewith in side elevation.

The rolls of frictioned fabric are placed upon the four fabric holders,

A, and the strips drawn off by feeding them over the liner reels B in such manner that the liners are rolled up on the reels.

From the fabric holders, the frictioned fabric passes to a tension mechanism C, which serves to place it under suitable tension or stretching action. The rubberized fabric then passes over shaping rollers D that stretch the longitudinal median portions of the fabric, without correspondingly stretching the edges.

The shaping or stretching rollers are yieldingly mounted in any suitable manner, and a registering dial E indicates or registers the tension under which the fabric is placed by the stretching devices.

The fabric then passes to the rotary core F, upon which the carcass is built up. The reference letter G indicates the tread forming and spinning mechanism by means of which the tread is formed and the sheets of fabric are stretched into position, and H indicates the bead setting mechanism.

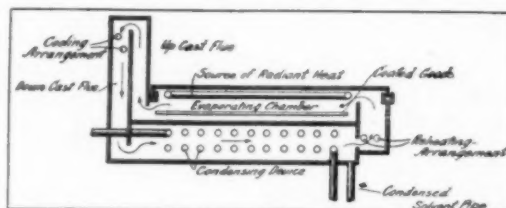
The machine is provided with a change-speed mechanism, and is driven by an electric motor shown at I. [Franklin W. Kremer, Carlstadt, New Jersey. United States patent No. 1,216,329.]

THE BAKER SOLVENT RECOVERY APPARATUS.

The illustration is a vertical transverse section of this invention applicable to the recovery of solvents from rubber-coated fabrics.

In operation the coated fabric is constantly moved through the apparatus; the air contained therein is first heated by the reheating coils, thereby decreasing its density, and increasing its evaporating capacity. The heated air is then conducted over the coated surface which is subjected to the heat radiated from the heating coils. The heat lost by the coated fabric and the air in contact with it, due to the latent heat, is made good by radia-

tion from the coil in the upper part of the evaporating chamber. Thus a smaller volume of circulated air effects the same amount of evaporation and a higher concentration of evaporated solvent is reached, as well as more uniform and rapid drying, without risk of overheating. The current of air carrying a large percentage of evaporated solvent, is now cooled to the saturation point by contact with the cooling coils. The mixed air and solvent vapors thereupon acquire their greatest density, and fall



downwardly through the vertical passageway until the condenser is reached. The available part of the solvent is then condensed and removed through the discharge pipe. A portion of the solvent having been separated from the current of air, the latter is again conducted upwardly into contact with the heating coils, thereby decreasing the specific gravity and causing it to again circulate in contact with the coating to be dried. [Theodore Baker, assignor to E. I. du Pont de Nemours—both of Wilmington, Delaware. United States patent No. 1,218,616.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,216,315. Trimming device for rubber cloth and the like. O. E. Heckman, Akron, Ohio.
- 1,216,497. Machine for trimming the canvas of reinforced insoles. T. Ringenbach, Rosedale, Ky.
- 1,216,539. Machine for cementing boots and shoes. W. D. Baker, Abington, assignor to Reece Machinery Co., Boston—both in Massachusetts.
- 1,217,879. Making cord tire fabric. E. A. Pye, Newark, N. J., assignor to Musselman Cord Fabric Co., Chicago, Ill.
- 1,218,100. Steam-repair vulcanizer. J. Mathey, Omaha, Nebr.
- 1,218,101. Steam repair vulcanizer. J. Mathey, Omaha, Nebr.
- 1,218,155. Machine for painting tire-casings. J. F. Zimmerman, Akron, Ohio.
- 1,218,245. Vulcanizing repair tool. E. R. Draver, Richmond, Ind.
- 1,218,441. Repair vulcanizer. J. Michel, Philadelphia, Pa.
- 1,218,641. Mold for rubber articles. H. E. Fry, New York City.
- 1,218,763. Tensioning device for tire making machines. F. H. Grove, Columbiana, Ohio.
- 1,218,881. Tire rim setter. V. C. McLain, assignor to E. J. Bronson—both of East Moline, Ill.
- 1,219,026. Stretching-machine. H. L. Morris, assignor to The Savage Tire Co.—both of San Diego, Calif.
- 1,219,351. Apparatus for making hollow rubber articles. F. T. Roberts, Cleveland, Ohio.
- 1,219,414. Vulcanizing-tongs. F. O. Lake, Washington, D. C.

THE UNITED KINGDOM.

- 14,582 (1915). Apparatus for gaging the thickness of sheet india rubber, etc., as the sheets issue from the calendaring machine. C. J. Beaver, Rangemoor, Crescent Road, Hale and E. A. Claremont, Broom Cottage, High Legh—both in Cheshire.
- 102,495 (1915). A tool for tapping india rubber trees. J. Bosch, Koheripari, near Manondjaja, Java, Dutch East Indies.
- 102,754. Making rubber shock absorbers. A. Turner, and H. J. Turner (trading as L. Turner & Co.), Deacon street, Leicester; F. Sage & Co., 60 Gray's Inn Road, London, and N. A. T. N. Feary, 17 Paston Lane, Peterborough.
- 102,802. Footwear vulcanizer. A. E. Alexander, 306 High Holborn, London. (Goodyear's Metallic Rubber Shoe Co., Naugatuck, Connecticut, U. S. A.)
- 15,133 (1915). Apparatus for use in the manufacture of rubber shoes. W. J. Jackson-Mellersh, 28 Southampton Buildings, London. (Boston Rubber Shoe Co., Malden, Massachusetts, U. S. A.)
- 15,438 (1915). Rubber testing machine. H. H. Grundy, 393A, City Road, and P. Schidrowitz, 57 Chancery Lane—both in London.
- 15,508 (1915). Repair vulcanizer. G. Guattieri, and L. Cavalletti, Via Nazionale, Rome.

THE DOMINION OF CANADA.

- 173,025. Hose vulcanizer. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee to H. G. Blanchards, New York City, and F. Duesler, Cleveland, Ohio—both in U. S. A.
- 173,079. Tube machine. A. Hleecker, Akron, Ohio, U. S. A.
- 173,333. Tire mold. The United States Rubber Co., New York City, assignee of C. F. Adamson, East Palestine, Ohio, U. S. A.

- 173,343. Tire building machine. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of G. F. Fisher, Roselle, New Jersey, U. S. A.

- 173,425. Wrapping machine for hose. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of H. Z. Cobb, Winchester, Massachusetts, U. S. A.

THE FRENCH REPUBLIC.

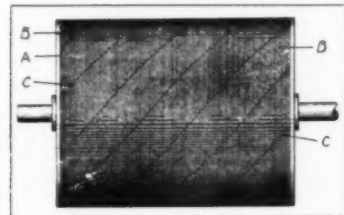
- 481,607 (April 27, 1916). Improvements in a machine for the manufacture of tires. The Hartford Rubber Works Co.

- 481,795 (May 16, 1916). Mold for the manufacture of rubber heels. J. G. Eufford.

PROCESS PATENTS.

MAKING CORD TIRE FABRIC.

BY this method cord fabric may be made in lengths greater than can be obtained by cutting standard cord fabrics on the bias. Referring to the drawing, *A* is a cylindrical drum on which a single layer of cord *B*, *B* is wound in close contact. The drum can be of any reasonable diameter so that fabric of great length may be produced. When a layer of cord has been wound on the drum, a coating of rubber solution is applied that serves to hold the threads together. The drum is then revolved at high speed and the layer of fabric cut into spiral bands of the required width, as shown at *C*, *C*.



After cutting, the completed bands, in which the strands lie at an angle of 45 degrees, are removed from the drum and employed in building cord tire casings in the usual way. While only one layer is shown, it is obvious that two or more layers may be applied to the drum, rubber solutioned and cut in the above described manner. [Ernest A. Pye, Newark, New Jersey, assignor to Musselman Cord Fabric Co., Chicago, Illinois. United States patent No. 1,217,879.]

SEMI-METALLIC PACKING. Fifty to 75 parts, by weight, of fiber, 10 to 30 parts of rubber or other gum, 10 to 30 parts of shredded metal, and 5 to 15 parts of filler are thoroughly mixed together at the required temperature, and the mass rolled into sheets. Thick sheets are built up from a plurality of thin sheets secured together by rubber cement, the sheets being laid, with the shreds of metal lying in different directions. [Louis J. Ryan, assignor to the Royal Equipment Co.—both of Bridgeport, Connecticut. United States patent No. 1,215,064.]

CUSHION TIRE. The body and tread are formed of granulated rawhide impregnated with rubber and the inner tube is made of mercerized rubber-treated fabric of special weave. [Albert H. Henderson, assignor to the Henderson Rubber Co.—both of Baltimore, Maryland. United States patent No. 1,215,275.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,216,654. Method of vulcanizing rubber. W. B. Burke, assignor to The Burke Process Co.—both in Cleveland, Ohio.

- 1,218,350. Method of impregnating woven belts and conveying-bands with balata. H. W. Anderson, Odense, Denmark.

- 1,218,949. Process of treating rubber. E. E. A. G. Meyer, assignor to Morgan & Wright—both of Detroit, Mich.

THE DOMINION OF CANADA

- 173,169. Process of making hard rubber articles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of H. Weida, Highland Park, New Jersey, U. S. A.

- 173,026. Process of making hollow rubber articles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of N. D. Crawford, Elizabeth, New Jersey, U. S. A.

- 173,344. The process of manufacturing hose. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of A. E. Hopkins, Cleveland, Ohio, U. S. A.

THE FRENCH REPUBLIC.

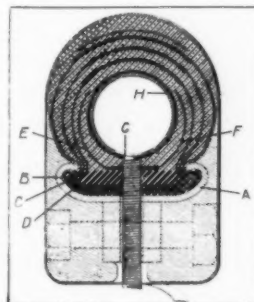
- 481,851 (August 23, 1915). Process for the recovery of casings especially non-skid tires. L. B. Becker.

- 481,544 (April 19, 1916). Process for impregnating fabric with gutta percha, balata, or other similar substances. Aktieselskabet Roulunds Fabrik.

MISCELLANEOUS PATENTS.

THE THROPP PNEUMATIC CUSHION TIRE.

IT is claimed that the qualities of the pneumatic tire are combined with the well-known advantages of the cushion tire in this invention. Moreover, the tire is permanently attached to the rim with a hard rubber compound, and is vulcanized by the open cure, wrapped tread process.



Referring to the illustration, a transverse section of the tire in its mold, *A*, is the rim on which is first placed a layer of a hard rubber compound, and a strip of frictioned fabric *B* being circumferentially laid thereon. Another layer of rim compound is then applied and a second fabric strip *C* superposed, followed by still another layer of rim compound,

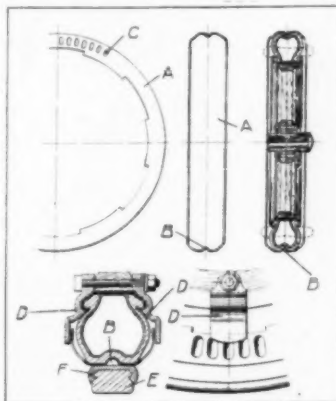
over which is placed a third fabric strip *D*. The rim is then filled to the level of its edges with rim compound, on which is laid a layer of softer compound followed by fabric strips *E* and *F*.

The air valve *G* of the inner tube *H* is then forced through the opening in the rim and inflated sufficiently to hold its circular form. After a layer of soft compound is laid around the inflated tube, the fabric strips *E* and *F* are formed around it, and a second layer of similar compound superposed and covered by the outer edges of the fabric strip *D*. Then a third layer of compound is applied and covered by the fabric strip *C*, followed by a fourth layer covered by fabric strip *B*.

More compound is then laid on, including a breaker strip and tread portion when the tire is placed in the mold, wrapped and vulcanized. [Peter D. Thropp, assignor to the De Laski & Thropp Circular Woven Tire Co.—Trenton, New Jersey. United States patent No. 1,217,665.]

A FRENCH PUNCTURE-PROOF TIRE.

The object of this invention is to eliminate the usual tread and breaker strip in the construction of pneumatic tires. The casing is built up in the usual way, but without the tread, however, and is afterwards cured in the ordinary manner.



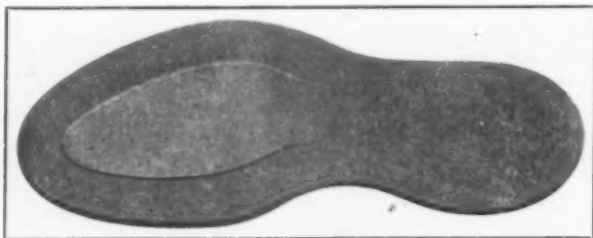
The tread band *A*, shown in the upper illustration, is an annular sheath of sheet metal that is slipped over the tire before inflation, being centered and held in place after the tire is inflated by the annular, median groove *B*. The metal band completely covers the tread and the sides extend down far enough to protect the tire against puncture. The sides are also far enough away to allow the expansion and contraction of the tire while in use. Both sides of the band are perforated around their entire circumference; a few of these perforations are shown at *C*, which are intended to prevent the accumulation of mud and dirt.

To prevent the band from slipping off the tire in case it should become deflated, six pairs of metal clips *D*, shown in the lower drawing, are removably attached to the rim by transverse bolts. A modification consists of a solid rubber tread *E*, vulcanized to a metal rim *F* welded or riveted to the band *B*. [R. de Prandieres. French patent No. 481,350.]

New Goods and Specialties.

FIBER SOLE WITH MOLDED LIFT.

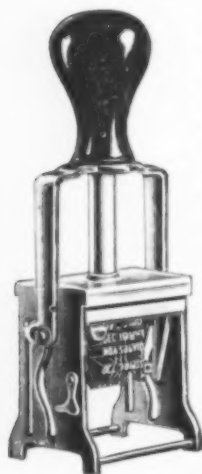
IN the present condition of the leather market, the demand for fiber-sole shoes, in which rubber is used, can scarcely be overestimated. Improvements in composition and adaptation for the intended purpose are constantly being made, and the fiber sole shown herewith contains an entirely new feature for which special merit is claimed. This improvement is in the form of a lift of the same material, molded on the sole and obviating the necessity for the usual cork filler in the space between the outsole and the insole of the shoe. The solid fiber supports the insole, maintains the welt in position, and increases the wearing capacity. The raised part, when on the shoe, gives the edges a pulling power in the opposite direction, offsetting the pull of the welt and preventing it from returning to its original position when stitched to the upper and thereby causing the edges of the sole to turn up—



a common fault in fiber-sole shoes. The construction of the sole also prevents air pockets under the outsole which are very disagreeable when stepping on a small stone.

It is possible, with this sole, to add one-half of the thickness at the point of wear and yet maintain as thin an edge as required for good appearance on women's shoes. [Donnelly Machine Co., Brockton, Massachusetts.]

KOSSUTH DATER WITH SOLID RUBBER BAND.



The usual device for date stamping has a number of rubber bands covering a metal revolving apparatus, but in the self-inking dater, here illustrated, rubber projections with the imprint of the necessary dating type are molded in a solid rubber band. The action of a new style date slot prevents corrosion from contact with the rubber date band, insuring the free entry of dates at all times. The movement is roller bearing and is claimed to eliminate practically all friction to the wearing parts. The frame is of heavy steel throughout, with no extra swinging plates or attachments. A supplemental die plate takes the printing die and holds the type in perfect alinement. The Kossuth dater is made in two sizes. In the one shown the die plate measures $2\frac{1}{8}$ by $1\frac{1}{2}$ inches. [R. A. Stewart & Co., New York City.]

PUBLIC NOTICE ON A RUBBER MAT.

A neat combination of utility and comfort is seen in front of a hotel doorway on Broadway, New York City. A large rubber mat, perhaps 20 feet long and covering half the width of the sidewalk is of the usual perforated pattern, but has in letters a foot long the words "Keep This Space Clear," a standing notice to chauffeurs and coachmen not to occupy the street in

front of the doorway except when taking on or delivering passengers.

"TYRIAN" FIRST-AID TOURNIQUET.

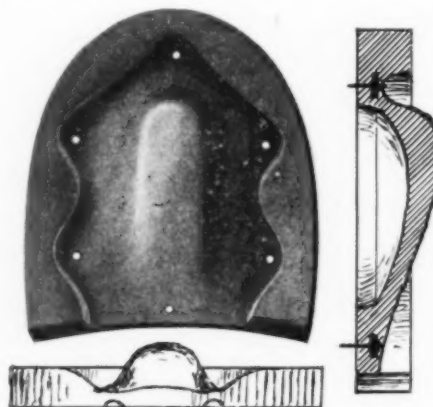
A tourniquet that can be quickly applied and that holds fast at the desired tension is a valuable adjunct to first-aid equipment, and the "Tyrian" tourniquet, here shown, is specially de-



signed to meet these requirements. It is made entirely of rubber, 3 feet long, $\frac{7}{8}$ inch wide and $\frac{1}{8}$ inch thick, with a nickel-plated clasp and spring attachment which affords a firm fastening, easily secured. To apply this tourniquet the lever at the spring is depressed, the loose end of rubber inserted, the pressure relaxed in the spring and the rubber drawn to the desired tension. [Tyler Rubber Co., Andover, Massachusetts.]

PNEUMATIC CUSHION HEEL.

In the rubber heel here shown, a mechanical cushioning device which operates automatically supplements the beneficial effect of the usual rubber heel. When a heel built on this principle is attached to a shoe, the central portion, indicated in the illustration, strikes the ground first at every step taken. Owing to the construction of this central tread portion, with its recess and cooperating pneumatic chamber, it will be forced inward,



compressing the air therein and absorbing the first shock, thus bearing the heaviest part of the impact while the wearer is walking or standing. After being forced inward, the centrally projecting tread portion will be flush with the peripheral tread portion, the latter acting in turn as a cushion, in the same manner as any ordinary solid cushion rubber heel. A cupping or suction is thus produced between the peripheral tread portion and the street pavement or ground surface, insuring a firm grip and anti-skid quality, which is claimed to maintain its efficiency during the entire life of the heel.

This principle may be carried out for the sole of a shoe and is particularly applicable to the requirements of athletic footwear. The special advantages claimed for this heel are reduced weight and consequent saving in cost of manufacture; greater resiliency, and sure grip. [Oscar Mussinan, New York City.]

ALL-WEATHER SLEEPING BAG.

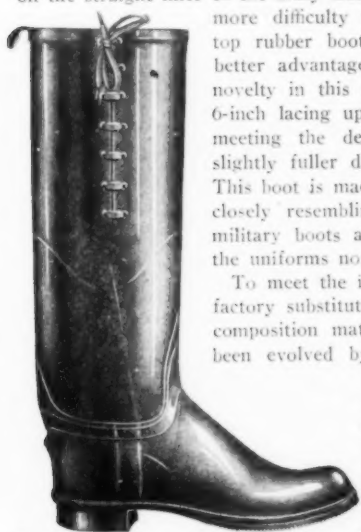
The sleeping bag shown in the accompanying illustration is designed for maximum comfort and protection while sleeping outdoors. The light weight, rubberized material used is suitable for all kinds of weather, a woolen blanket wrapped around



the body affording extra warmth if needed. A hood protects the head, and a netting is attached by special fasteners to keep out the mosquitoes. Plenty of room is afforded, the dimensions being 7 feet 6 inches in length and 4 feet 3 inches wide. The bag is fitted with an inside pad and bolster, pockets for valuables, and a rattan bow which is adjusted when in use, to hold the hood in place. [C. W. Sirch, Los Angeles, California.]

LACED MILITARY RUBBER BOOT AND "TENAX" SOLE.

An exceptionally neat appearing rubber boot favored by army officers is shown in the accompanying illustration. It is made on the straight lines of the army leather boot, drawing on with more difficulty than the old-style, loose-top rubber boot, but appearing to much better advantage when on the foot. The novelty in this model is contained in the 6-inch lacing up the side, this innovation meeting the demand of those requiring slightly fuller dimensions around the leg. This boot is made in tan color, thus more closely resembling the regulation leather military boots and more in keeping with the uniforms now in vogue at the front.



To meet the insistent demand for satisfactory substitutes for sole leather, a new composition material called, "Tenax" has been evolved by the same manufacturer through painstaking experimentation and thorough testing of results in actual wearing practice. It contains sufficient rubber to impart proper flexibility and to protect the feet against wet pavements and walks, and it is claimed that this material possesses remarkable non-slip qualities, cuts to ad-



vantage and holds stitches well, being similar to leather in strength and toughness, lightness and long wear. It is made in

the various shapes and thicknesses required by the trade and is also supplied in rolls. [Gutta Percha & Rubber, Limited, Toronto, Canada.]

PRODIUM TRUCK TIRES.

A new feature in the tire equipment of 1917 commercial cars is the Prodiem truck tire. This is a new pressed-on type of the channel-base tire with a wide tread that is designed to carry heavy loads. It is made from special compound that produces a soft, flexible and resilient tread of unusual tensile strength and durability. This tire is made in all sizes and in order to facilitate prompt service to customers, all branches of the company are equipped with tire applying presses. Tests have been made under severe road conditions in which tires of this make are said to have averaged better than 12,000 to 14,000 miles. [The Republic Rubber Co., Youngstown, Ohio.]

**ALL-RUBBER "HYDRO" SUIT.**

The adaptation of rubber and rubberized materials in clothing for various purposes is constantly increasing, with added im-



provements and devices for the comfort and protection of the wearer. The all-rubber one-piece costume shown herewith is now in use on many of the United States submarines. It is made of the best rubber sheeting, all seams being steam vulcanized. The belt at the waist and removable straps at the trouser knees prevent the suit from drooping when in use and afford adequate knee room. The elastic wrists fit tightly and the neck has tie-straps for close fitting.

The rubber cap worn with this "Hydro" suit has snap fastenings and an adjustable cape which reefs close with extra studs. The wearer is thus completely covered with rubber from head to foot. [Abercrombie & Fitch Co., New York City.]

RUBBER PORK BAIT.

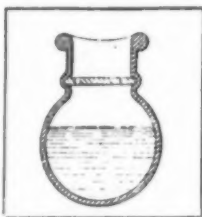
The use of strips of pork rind as a bait in fishing has long been recognized by those "in the know" as a first-class fish-catcher. It is white in color, flexible, and possessed of a tantalizing wiggle.



Pork bait is now successfully imitated and also improved upon by using specially prepared, pure, white rubber with white, red or black heads, in the form shown in the accompanying illustration. This rubber bait is, of course, extremely flexible, responding to the slightest movement, and it is claimed to imitate perfectly the action of a live minnow. An evident advantage over the actual pork rind is its lasting quality, one rubber pork bait being used many times. It is made in two sizes: 3½ inches long for bait casting, and 2 inches long for fly fishing. [S. Arnold, Kansas City, Missouri.]

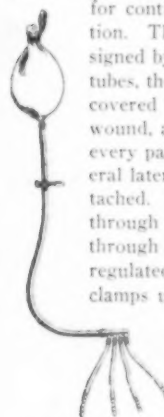
RUBBER EYE CUP.

An eye bath made entirely of rubber is formed with a bulb portion by which the liquid is forced upwards against the eye. The neck, which may be stiffened by thickening or corrugating its wall or by means of a rigid collar, is provided with a soft ringed edge. A perforated check-plate may be fitted in the base of the neck. [H. St. C. Mason, Hendon, Middlesex, England. British patent No. 102,870.]

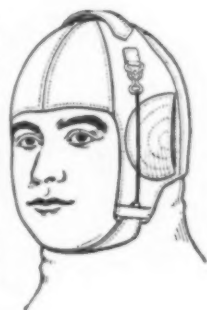
**RUBBER TUBING FOR WOUND IRRIGATION.**

A new and remarkably successful treatment for infected wounds, which was mentioned in the January, 1917, issue of THE INDIA RUBBER WORLD, embodies the use of various rubber tubes for continuous irrigation with a special antiseptic solution. The apparatus for this method of treatment, designed by Dr. Alexis Carrel, consists of sterilized rubber tubes, the ends of which are perforated with many holes, covered with sponge tissue and introduced into the wound, as many of them as may be needed to reach its every part. The tubes lead up to a glass tube with several lateral orifices to each of which a rubber tube is attached. The solution flows from a glass receptacle through a rubber pipe into the glass tube and thence through the rubber tubes to the wound, its flow being regulated either by a drop-counting apparatus or by clamps upon the tubes.

When the wound becomes thoroughly sterile it is sewn up, and a favorite sewing of Dr. Carrel's for large, deep wounds closes like a laced shoe; two broad strips of adhesive plaster, each bearing a row of hooks, are stuck to the skin along the edges of the wound and a pair of rubber laces is twisted back and forth and drawn tight, thus obviating the necessity of sewing through the skin.

**AVIATOR'S HOOD.**

The aviator's hood here illustrated is made of rubberized material shaped to fit the head closely, yet comfortably, with a single strap fastening that is easily attached. These hoods are exceptionally neat in appearance, and are claimed to be lighter in weight and less mechanical than many others, while preserving all the necessary protective qualities. They are equally suitable for professional automobilists to wear while competing in road races. [Sanders Co., Indianapolis, Indiana.]

**"PNEUMASTIC" TIRE FILLER.**

A new tire filler, consisting almost entirely of rubber, the slight proportion of other ingredients adding to its toughness and long wearing qualities, is now on the market. The substance thus formed is very light and resilient, and it is claimed that "Pneumatic" possesses extreme flexibility, uniformity of power and greater momentum, with entire absence of heat and friction, giving increased mileage from tires without sacrifice of riding comfort. The claims of the manufacturer are substantiated by a written guarantee for a period of two years, free replacement being made should the filler prove defective in any way during that time. [The Altenburg Tire & Rubber Co., Davenport, Iowa.]

1914-1916 RUBBER PRICE ADVANCES SMALL.

THAT the rubber industry has fared exceptionally well in respect to its most important raw material since the outbreak of the European war is gleaned from a report just issued by the Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 52. Wholesale prices of leading articles in United States markets at frequent intervals from January, 1914, to December, 1916, New York, Boston and Chicago quotations, are tabulated, and indicate that whereas crude rubber (Upriver fine) had increased only 27.6 per cent at the end of the period, leather, hides, wool, manila, lead and zinc had nearly doubled; iron, steel and sisal hemp had more than doubled; while Bessemer and open-hearth steel had trebled. Cotton had increased 39 per cent in price; jute butts, 36 per cent; raw silk, 26.5 to 42.8 per cent, according to grade; and mohair 48.6 to 71.4 per cent. The only important raw materials mentioned which had undergone less increase than rubber were tin, 12 per cent; jute, 13.8 per cent; crude petroleum, 14 per cent; and silver (London quotations 0.925 fine) 26.7 per cent.

THE MARKS RECLAIMING PATENT.

It may be remembered that in THE INDIA RUBBER WORLD of January 1, 1916, a full report was published of a decision of the United States Circuit Court of Appeals affirming the decision of the District Court in Buffalo, New York, sustaining the validity of the Marks or "Alkali" patent for rubber reclaiming. The latest phase of the case is the decision handed down March 12, 1917, which affirms the decision of the District Court in Ohio, thus holding that the patent is invalid. It will, therefore, be seen that these two decisions, diametrically opposite, have both been affirmed by higher courts and the questions of the validity of the patent and of infringement are still undetermined.

RECOVERY OF RUBBER AND FABRIC FROM TIRES.

In practically all processes for reclaiming rubber from tires the fabric is destroyed. In these days of conservation, however, the recovery of the fabric as well as the rubber is well worth consideration. In the lists of chemical patents printed in the May and November, 1916, issues of THE INDIA RUBBER WORLD, brief mentions were made of a process having the above economy for its object, as worked out by C. de Villers, of Neuilly, France.

In the preparation of rubber cements it has already been proposed to employ tetrachlorethane as a rubber solvent. De Villers uses this substance, heated to a boiling point, for the purpose of dissolving the rubber and also a second time, for freeing the rubber from sulphur.

The tires are placed in a closed receptacle containing tetrachlorethane, enough of the latter being used to completely cover them. The vessel is heated, directly or by means of steam, to the boiling point, and the vapors produced are passed into a condenser. At first the rubber swells and then dissolves into a liquid, and at the end of an hour the fabric is completely freed of rubber. This mass is next sent to the filter press to separate the fabric from the rubber in solution, and since the supply of tire fabric is so much smaller than the actual demands after further cleansing, this fabric can be utilized to advantage.

The rubber is then precipitated from the solution by the addition of water. To free this rubber from sulphur it is subjected to a first treatment with tetrachlorethane, which is prolonged until the rubber begins to swell, indicating that the free sulphur is then dissolved. This tetrachlorethane charged with sulphur is allowed to run off and is replaced by a second quantity of fresh tetrachlorethane which, after having been brought to boiling point, dissolves the desulphurized rubber. It will be seen that this treatment passes through two phases, tetrachlorethane only being employed.

JUDICIAL DECISIONS.

DUNLOP RUBBER CO., LIMITED, v. MICHELIN TYRE CO., LIMITED. This was a claim by the plaintiffs, who sought to recover damages for alleged libel; also an injunction to restrain from publication of the matter complained of. The defendants denied publication of libel, or that the publications referred to plaintiffs and bore defamatory meaning or were capable of malice. They plead privilege of the occasion and counter-claimed for damages and alleged libel; plaintiffs in reply denied libelling the defendants.

Plaintiffs complained that the Michelin company had attacked their honesty and integrity in their advertisements which appeared in the same newspapers and were designed to have a greater effort upon readers by repetition.

In their counterclaim the defendants stated that the plaintiffs had advertised against them, attacking them as foreigners responsible for the sale of rubbish.

After due deliberation the jury found for the plaintiffs on the claim, with £1,000 damages, and for the defendants on the counterclaim with £750 damages. ["The India-Rubber Journal," London, February 17 and 24, 1917.]

ADAMSON v. GILLILAND. This is a suit brought by the petitioner for the infringement of a patent for a vulcanizing device.

This device consists of two sheets of metal, between which, when heated, the material is to be vulcanized. The upper side of the upper of these sheets is shaped like a cap in which gasoline can be placed to heat it.

Defendant admitted making and selling devices like the plaintiff's, but testified that he made them first. The plaintiff put his invention on the market in November, 1911, and the defendant did not put out his vulcanizer until February or March of the following year; but the defendant declared that on August 7, 1911, 12 days before the plaintiff made the drawing of his invention, he had had castings made that are identical with plaintiff's device. The plaintiff's cup had pins projecting from the bottom arranged in circles around a central one, which he declared served to conduct the heat of the flame downward into the vulcanizing plate and the combustible fluid. Defendant's original castings showed a similar arrangement; he explained that the similarity was accidental; that the pins were of no use and that they were merely there to be used as a talking-point to deceive the public.

It was held that since plaintiff had made public his device, while defendant had not, and there was no other channel of information between the two, plaintiff must be regarded as the originator of the device. In a previous suit by the plaintiff, District Judge Geiger decreed for the plaintiff. The district judge, after hearing and criticizing additional evidence, said that the new testimony would not have changed Judge Geiger's opinion. The circuit court of appeals, regarding the action of the district judge as a yielding to the authority of the former decision, reversed the decree upon the evidence as it stood in print. [United States Supreme Court.]

LEONARD HARTUNG v. TEN BROECK TYRE CO., INC., Louisville, Kentucky. This was an appeal from the Circuit Court, Jefferson County, Common Pleas Branch, Fourth Division, which decided in favor of the defendant in the action for injuries by Leonard Hartung against the Ten Broeck Tyre Co. Hartung declared that a large counter weight on a lever which he operated became detached, the lever flew up and struck him in the breast, injuring him. It was held that there was not sufficient evidence of negligence on the part of the defendant. Judgment was affirmed. [Southwestern Reporter, Vol. 190, page 677.]

EUREKA FIRE HOSE CO. v. FURRY, CITY TREASURER, Van

Buren, Arkansas. This was an appeal from the Circuit Court, Crawford County; James Cochran, judge, which decreed for defendant in the cancellation of warrant's action. After purchasing hose from the appellant and issuing a warrant therefor, the city, Van Buren, called in its warrants.

Counsel for appellant contended that the special act attempting to raise Van Buren from a city of the second to a city of the first class is void, and all proceedings by officers of Van Buren as a city of the first class are void, including the call of the city's warrants for cancellation and reissuance.

It was judged that the officers were *de facto* officers acting under color of an election and at a time when the special act had not been declared unconstitutional, and their proceedings were therefore valid.

Judgment was affirmed. [Southwestern Reporter, Vol. 190, page 1427.]

FREY v. MARVEL AUTO SUPPLY CO. ASPECTS OF PATENTS. United States Circuit Court of Appeals, Sixth Circuit, decided that, even though every element of a patented combination covering a mechanical device be old, there may still be patentable invention if, by the combination, a new and useful result be produced, or an old result in a new and materially better way. [The Federal Reporter, Vol. 236, page 916.]

TRADE-MARK DECISIONS.

Among recent trade-mark decisions of interest to the rubber trade might be mentioned the following:

It has been decided that the name "Horseshoe" as a trade-mark for automobile tires, casings and tubes is not descriptive, even if, as supposed, the tread of the tire bears projections in the shape of a horseshoe. This decision further states that there is no mechanical advantage arising from this feature of the tire and the name is no more descriptive than the figures 4-11-44 would be if the projections were made in the form of these figures. As to the tubes, the mark is certainly not descriptive since the objection does not apply to them.

The trade-mark is allowed of a design showing the picture of a pneumatic tire within which is the head of a chauffeur, and above it the head of a bulldog grasping in its mouth the letters ALWASHOLD, in a peculiar form of lettering. It has been decided that this word is not descriptive as applied to a material for repairing tires. The other features overshadow the word in any event, but this is more than a case of misspelling of a descriptive word as the words themselves can only exist in connection with the bulldog's head.

In this connection it will be interesting to note that, according to the "San Francisco Chronicle," the Secretary of State of California has denied registration of a trade-mark to the Dam Sure Puncture Proof Co. because the mark for which application for registration was made was considered profane and its use, therefore, contrary to public policy. Not only this, but it was pointed out to the applicant company that the words were in any event descriptive of the goods and hence not registrable.

RUBBER INSPECTOR'S POSITION OPEN.

The United States Civil Service Commission announces an open competitive examination for inspector of rubber to fill a vacancy in the Quartermaster's Corps, Philadelphia, Pennsylvania, at \$1,200 to \$1,500 a year, and future vacancies requiring similar qualifications. Examinations may be held at cities near the residence of applicants, certain cities in each State being named. The date of examinations is April 18, and any men who desire to apply should write at once for form 304 to the Civil Service Commission, Washington, District of Columbia, stating that the examination desired is for "Inspector of Rubber (male)."

The Editor's Book Table.

YEAR BOOK OF THE CEYLON AGRICULTURAL SOCIETY, 1917. 1918. Compiled by C. Driberg, B.A., F.H.A.S., Colombo, Ceylon. [Small 16 mo., cloth, 144 pages.]

SECRETARY DRIEBERG has collected in this small volume a real compendium of agricultural and horticultural information of this important tropical island. It seems as if no practical hint which could be helpful to the vegetable or fruit planter is omitted. There are crop notes on cotton, tobacco, kapok, castor bean and dhall; veterinary notes, pests and diseases, and many rules, useful hints, etc., but practically no mention of rubber in any form. The list of officers and members is given; there is a clear, readable map, which shows in colors the annual rainfall. Not the least interesting feature of the book is the advertising department, consisting of a number of pages following the text.

MEDEDEELINGEN VAN DEN RYKSVORLICHTINGSDIENST TEN behoeve van den Rubberhandel in de Rubberrijverheid te Delft. Second series, 1916. Afdeling Handel, Lange Houtstraat 36, 'Gravenhage. [Paper cover, 544 pages. Many illustrations, diagrams and statistics. Price 2.50 florins.]

This publication of the Department of Commerce of the Netherlands Government contains numerous interesting reports of experiments and investigations in various departments of rubber chemistry and manufacture. A very elaborate introduction, besides expressing general ideas on inquiries pertaining to rubber, classifies the contents of the widely differing articles. This classification has six main divisions: (1) Inquiries in latex and judgment of crude rubber by its appearance; (2) chemical examinations of crude rubber; (3) the viscosity of crude rubber solutions; (4) depolymerization and oxidation of crude rubber; (5) experiments in vulcanization and examination of the vulcanized product as a basis for the inspection of crude rubber; (6) inquiries into the process of vulcanization.

An interesting article under the first heading is that by Professor G. V. Itersen, Jr., in which is explained and described an apparatus for determining the rubber content of latex. A report of the results of a scientific test of empiric judgment of crude rubber lays stress on the advantages and improvements that would arise from a general use of scientific methods in examination.

Attention must also be called to a review of the chief methods employed by the *Voorlichtingsdienst*, a series of mechanotechnical investigations and an essay on the great importance of chemical investigation for the future of plantation rubber. Among the papers concerning rubber inspection is one describing simplified methods for inspecting crude rubber, and another on the desirability of international inspection of crude rubber. The latter cites several methods as employed by foreign investigators and deplores the fact that fixing an international standard of inspection presents so many difficulties, owing to the lack of agreement of authorities on several important scientific points.

A report of the analysis of several products from lactiferous trees of Surinam and a comparison of gutta percha mechanically extracted from leaves and from stems of trees on the government gutta percha plantation of Tjipetir ought to interest many.

Valuable are the great number of clearly described experiments which concern problems, such as the effect of treatment with the washing mill; determination of resin content and its influence upon vulcanization; miscellaneous physical tests of vulcanized rubber; viscosity of rubber solutions; unsaponifiable resins; the influence of solvents on viscosity and porosity; improvement of rubber by heating in carbonic acid atmosphere; maximum of sulphur with which rubber unites; influence of time and temperature and the quantity of sulphur

used upon the properties of vulcanized rubber; observations on cold vulcanizing; the insolubles in rubber; the absorption of moisture by raw rubber in various atmospheres; paraffin as a filler for rubber; resin and impurities in balata and gutta percha.

MANUFACTURING COSTS AND ACCOUNTS. BY A. HAMILTON Church. McGraw-Hill Book Co., Inc., New York City. [8vo, 447 pages, illustrated. Price, \$5.]

The importance of an accurate system of cost accounting is one which is appreciated by every up-to-date industrial and commercial establishment. The author of this work has written a very exhaustive treatise as to the proper methods of keeping cost accounts in so simple a manner as to be readily understood. A number of methods are explained fully and their merits compared. There are chapters devoted to sales and selling expenses and to summarizing results. A large number of forms are shown, these being copies of cards, loose leaves, etc., in actual use in manufacturing establishments. At the end of the work is a department devoted to factory reports and returns, those of the foreman, the superintendent, and the executives. These reports are analyzed in order to show the efficiency of the workmen, the expenses of idle machinery, and the general department efficiency. With these reports brought into practical use the proprietors or management can tell the progress of the business and its exact standing at the time these reports are made.

While this latter department is devoted practically to machine shops, there is much in it which is adaptable to any factory using machinery, and the book contains a greater amount of theoretical and practical matter regarding costs and cost accounting than one would imagine could be packed in a single volume.

PHYSICAL AND CHEMICAL PROPERTIES OF GASOLENES SOLD Throughout the United States During the Calendar Year 1915. By W. F. Rittman, W. A. Jacobs and E. W. Dean. Government Printing Office, Washington, D. C. [45 pages. Price, 10 cents.]

This is the report of the investigation of government experts. It is mainly devoted to the study of values for combustion engines. Care has been taken to submit facts impartially, leaving to the reader the determination as to the superiority or inferiority of one kind over another for his individual purpose. Many tests were made—specific gravity, evaporation losses, calorific value, sulphur determinations, engine tests and content of unsaturated carbons. Eastern, Mid-Continent and California gasolenes were tested, as were also cracked gasoline, blended casinghead gasoline, and "straight" refinery product. The results are tabulated, and summarized, and make valuable reading. A fact that deserves mention is the undesirability of attempting to use motor gasoline as a solvent. This is shown by the high boiling points of some of the constituents in many gasolenes tested.

HANDBOOK OF CHEMISTRY AND PHYSICS. FIFTH EDITION. Chemical Rubber Co., Cleveland, Ohio. [Cloth, 414 pages, 4 by 6 3/4 inches. Price, \$2.]

This handbook is already known to many chemists in the United States, it being a favorite ready reference book of chemical and physical data. The fifth edition is a revision of the previous one, under the direction of Professors Charles B. Hodgman and M. F. Coolbaugh of the Department of Chemistry at Case School of Applied Science. Although small enough to fit easily in the pocket, it is packed full of chemical and physical facts and tables, so arranged as to be readily found. The present edition is about 60 pages larger than the previous one. Among the new features added is a new and more com-

plete table of gravimetric factors, and other important additions are a table of physical constants of the more common organic compounds and a five-place logarithm table. The book will be found very useful by every chemist and in every chemical laboratory.

NEW TRADE PUBLICATIONS.

J. P. DEVINE CO., manufacturer of vacuum dryers, solvent recovery apparatus, and other lines for similar purposes, has just published its "Miniature Bulletin No. 105," descriptive of apparatus required mainly by the chemical and allied industries, but containing some notice of apparatus used in rubber goods manufacture, chiefly autoclaves, kettles, and vacuum dryers. The bulletin is a small one, measuring about four by six inches, containing 32 pages, of which most of the left hand ones are blank. Each right hand page has a strikingly effective cut of one specialty, with a terse description, well displayed. A view of the experimental laboratory is interesting, and the pictures of the exterior and the interiors of the plant show the extent of the establishment.

The Southwark Foundry & Machine Co., Philadelphia, Pennsylvania, issues its catalog of valves and presses in a self-binder which enables its customers to keep it constantly up to date. Each page, 8½ by 11 inches, is devoted to one or more cuts and description of a single machine, the cuts being wonderfully well-executed half-tones from retouched photographs, and the descriptions comprehensive and accurate. The steam platen presses, tire-forcing presses, bead presses, hydraulic heater presses, quick opening vulcanizer doors and other specialties for the rubber manufacturing industry are fully presented in the latest issue.

The Akron Rubber Mold & Machine Co., Akron, Ohio, is sending to the trade a very complete catalog of its specialties for tire building and tire manufacturing. This contains in its 48 pages practically every mechanical requirement for these important lines of industry. The machines and other items of equipment are well illustrated, the cuts showing finely all the details, and each is fully described. To give a list of these would demand more space than is available, but the catalog is one well worth securing and filing.

Gutta Percha & Rubber, Limited, Toronto, Canada, sends out its catalog of Maltese Cross Rubbers, season of 1917-1918, in a finely printed book of 64 pages, with covers handsomely illuminated with the trade-mark of the company. The styles and shapes are pictured in excellent half-tones, and the descriptive text is given in both English and French. With this is sent a smaller booklet, containing net prices, particulars regarding packing, and other information of the line.

"War Loans and the United States" is the title of an absorbing pamphlet, issued by the Guaranty Trust Co. of New York, which reviews the loans made by our own country in its wars, from the outbreak of the Revolution to the end of the Spanish war; deals with the general subject of loans in connection with the present war in Europe; and discusses our lessons of the past and economic opportunities of the future. Our phenomenal gain in export trade and resulting increase in financial strength is detailed, and the plain obligation imposed upon us in holding 30 per cent of the world's total supply of gold is pointed out. It is conclusively shown that "a lending policy on our part would not only prove a species of protective insurance, but in effect would remove us from the debtor nation class to which we have heretofore belonged and might raise us to the very pinnacle among creditor nations—a class whose commercial prosperity is assured

and whose foreign trade relations are most permanently established."

The American Asiatic Association is sending out its monthly magazine under a new title, "Asia," and in a new and very attractive shape. The number for March consists of 80 quarto pages, finely illustrated, containing articles of value to those interested in the Far Eastern trade. The present number is devoted almost entirely to China and Japan, though there is also an able article on the Philippines by Manuel L. Quezon, former resident commissioner of the Philippine Islands and now president of the senate of the first Philippine Congress.

The Diamond Power Specialty Co., Detroit, Michigan, sends us a finely printed pamphlet entitled "Increasing Today's Profits," exploiting the soot blower manufactured by that company. It contains some interesting matter as regards the saving of heat and power by elimination of soot deposit, and explains how this deposit acts as a heat insulator. Illustrations of factories where this system is in use, diagrams, recording charts, and ledger sheets are reproduced to prove the claims set forth in the booklet.

John Burnham & Co., 115 Broadway, New York City, have compiled for free distribution a statistical card which will be of interest to holders of motor and rubber stocks. It includes capitalization, par value, present bid and asked markets, dividend rate and date of payment, percentage earned, high and low prices for 1916 and the production of the year in number of cars or gross sales of the leading automobile, automobile accessory and rubber companies.

According to the latest census of motor vehicles in Great Britain, the total number of automobiles and trucks in actual service is 171,607, about 5 per cent of the number registered in the United States on January 1, 1917, which was 3,541,738. In each of the seven states of New York, Ohio, Pennsylvania, Illinois, California, Texas and Iowa, there are more automobiles and trucks than in all of Great Britain. In the United States the production of cars for 1916 was well over 1,600,000.

A recent number of "Class," a journal devoted to trade and class-journal advertising, has an interesting article by Julius S. Holl, advertising manager of the Link-Belt Co., Chicago, Illinois, which might well be read and even re-read by all who have charge of the advertising and sales departments of large or small industries. It is a sort of confidential talk based on the writer's experience over a wide field, and a profitable expenditure of hundreds of thousands of dollars in trade journals.

The "Charlotte (North Carolina) News" has published an issue of 88 pages, devoted almost entirely to descriptions of the many textile mills in that state. Each plant is treated individually, pictures and text giving a very complete and comprehensive review of the cotton mill industry. The work was done by an independent investigator, a trained newspaper man, and one of the main objects, evidently, is to rectify some of the impressions caused by sensational reports of the conditions of the mill-workers of the South. The paper is a credit to the enterprise of this daily publication, and is one which shows the prosperity and extent of the cotton weaving industry of the "Old North State."

The Underwriters' Laboratories "Electrical Data" gives a brief review of the institution, and the work carried on in 1916. Following this are described in detail fires and accidents reported due to electrical causes, with results of investigations. Illustrations of some of these accidents, also views of the laboratories are shown.

THE RUBBER ASSOCIATION OF AMERICA, INC.

AT a special meeting of firm members of the Association held March 7, 1917, the following amendments to the constitution and by-laws were adopted:

Amend Article VI, Section 2, by adding to the first paragraph the words "on which all persons connected with firm members in an official or executive capacity are eligible for appointment, unless otherwise provided."

Amend Article VI, Section 2, sub-division (a) by striking out the words "firm representatives," and substituting therefor the word "members."

Amend Article VI, Section 2, sub-division (b) by striking out the words "firm representatives," and substituting therefor the word "members."

Amend Article VI, Section 2, sub-division (c) by striking out the words "firm representatives," and substituting therefor the word "members."

Amend Article VI, Section 2, sub-division (d) (see our circular letter of December 22, 1916) by striking out the words "by them selected, or" in the fourth line of the third paragraph; by striking out the word "their" in the seventh line of the third paragraph and substituting therefor the words "the disputants"; by inserting the words "named in the said List of Official Arbitrators" after the words "Any two persons" in the fifth paragraph; by striking out the words "said List of Official Arbitrators" in the second line of the fifth paragraph and substituting therefor the words "the same source"; by striking out the word "arbitrators" in the same paragraph and substituting therefor the word "umpire."

Amend Article VI, Section 2, sub-division (d) by striking out the sixth paragraph entirely.

Amend Article VI, Section 2, sub-division (e) by striking out the words "either firm representatives or."

Amend Article VI, Section 2, sub-division (f) by striking out the words "either firm representatives or."

These amendments cause the entire Section 2 of Article VI to read as follows:

Section 2. Standing Committees. The Board of Directors or the Executive Committee shall annually appoint the following Standing Committees on which all persons connected with firm members in an official or executive capacity are eligible for appointment, unless otherwise provided:

(a) A Committee on Nominations, to consist of five members, who shall prepare and send to each "Firm Member" at least 30 days before the annual meeting a list of persons nominated by them for directors to be voted upon at the annual meeting; but any other members eligible to hold office, as provided in Article III hereof, may be nominated for election at the annual meeting, provided a written request therefor is received from 20 members and is in the hands of the Secretary in time to be sent to each "Firm Member" at least 15 days before the date of the annual meeting.

(b) Auditing Committee to consist of two members, who shall annually audit the accounts of the Treasurer.

(c) Committee on Legislation to consist of three members, who shall keep in touch with local, State and Federal legislation affecting the rubber industry; to secure copies of bills and report thereon to the Executive Committee or the Board of Directors whenever in its opinion it may deem necessary.

(d) A committee on arbitration to consist of seven members, four of whom shall be manufacturers and three crude rubber importers or brokers. The chairman of such committee shall be chosen by the members from their own number for a term of three years, and the term of each of the additional members shall be three years, except that at the time when this Committee shall be originally appointed the six members then appointed, other than the chairman, shall decide by lot which of their number shall serve for periods of one, two and three years, respectively, two members of the Committee being assigned to each class, and that thereafter two members shall be appointed by the Board of Directors or by the Executive Committee in each year. If any vacancies should occur in this Committee, such vacancies may be fulfilled by the Board of Directors or by the Executive Committee at any regular or special meeting.

DUTIES.—This Committee shall have complete supervision in respect to all matters for arbitration referred to The Rubber Association of America, Inc., and shall make rules and regulations for the conduct and disposition of all matters

submitted to arbitration subject to the approval of the Board of Directors or of the Executive Committee. It shall provide a form of agreement not inconsistent with existing provisions of law, which, so far as practicable, the decisions of the arbitrator or arbitrators shall be as effective as judgments of the Supreme Court of the State of New York. It shall compile and from time to time revise and keep a list of qualified persons, not less than 25, willing to act as arbitrators under these rules, and who shall be members of The Rubber Association of America, Inc. This list shall be known as "The List of Official Arbitrators of The Rubber Association of America, Inc."

Any matter in controversy may be referred to arbitration by the disputants signing the form of agreement provided by the Committee, together with a stipulation to the effect that they will abide by the decision of the arbitrator or arbitrators, selected by the Arbitration Committee, and waiving any and all rights to withdraw from such submission after the acceptance of their appointment by the arbitrator or arbitrators selected, and designating at the disputants' selection of either of the two following options:

(1) One of the persons named in said List of Official Arbitrators, who shall act as sole arbitrator; or

(2) Any two persons named in the said List of Official Arbitrators to act as arbitrators, who in turn shall designate from the same source a third person to be associated with them as umpire.

The Committee on Arbitration shall, from time to time, establish a schedule of moderate fees to be paid in all matters submitted, which fee shall be chargeable as decided by the arbitrators.

The Secretary of The Rubber Association of America, Inc., shall be the Clerk of the Committee on Arbitration.

(e) A Banquet Committee, to consist of three members, who may be Associate Members.

(f) An Outing Committee, to consist of three members, who may be Associate Members.

CHANGE IN THE BRITISH RUBBER GUARANTEE.

The British Government has slightly altered the rubber importers' guarantee by substituting the words "sell or deliver" for the word "sell," in the seventh line of the second paragraph. This change has been made necessary because of rubber having been consigned to New York firms as "bailees," without their knowledge or consent.

DIVISION MEETINGS.

The Rubber & Fibre Sole Division met at the Association rooms, March 9; W. H. Yule of The B. F. Goodrich Co., Akron, Ohio, presided. A good attendance and a very satisfactory meeting was reported.

The Rubber Reclaimers Division held a meeting in the Association rooms March 13. In the absence of Francis H. Appleton, Clark W. Harrison, Bloomingdale Rubber Co., New York City, presided. Matters pertaining to extension of the division's activities were discussed and committees appointed.

EXPORT TRADE DIVISION FORMED.

At a recent meeting of the Board of Directors it was voted to extend to the member manufacturers the opportunity of organizing an Export or Foreign Trade Division similar in scope and intent to the other trade divisions of the Association already in existence. Pursuant to this vote a meeting was held in the Association rooms March 21. There were 25 export managers present and W. V. Logan, of the McGraw Tire & Rubber Co., was elected chairman. The following Committee on Nominations was appointed: John Macfadyen, chairman, Good-year Tire & Rubber Co., New York City; C. O. Brandes, Firestone Tire & Rubber Co., Akron, Ohio; Henry G. Tyer, Tyer Rubber Co., Andover, Massachusetts. The Committee on By-Laws follows: D. H. Broadwell, chairman, The Fisk Rubber Co., Chicopee Falls, Massachusetts; C. E. Wagner, Miller Rubber Co., Akron, Ohio; E. H. Huxley, United States Rubber Export Co., Limited, New York City; G. C. Chalmers, Hodgman Rubber Co., Tuckahoe, New York; A. S. Hardy, Manhattan Rubber Manufacturing Co., New York City.

The Obituary Record.

HEAD OF A GREAT WIRE CONCERN.

FERDINAND W. ROEBLING, treasurer and general manager of the John A. Roebling's Sons Co., Trenton and Roebling, New Jersey, died at his home in the former city March 16, aged 75 years.



F. W. ROEBLING.

Mr. Roebling was born February 27, 1842, at Saxonburgh, Pennsylvania, where his father, John A. Roebling, established the first wire rope mill in the United States. Six years later, this business was removed to Trenton, and the family has resided there ever since. Ferdinand W. Roebling graduated from the Polytechnic College and immediately became associated with his father, becoming later treasurer and general manager of

the company, which under his direction he saw grow from small beginnings to one of the important industries of this country, employing 7,000 hands.

Foreseeing the importance of electrical progress, he developed the insulated wire and cable branch of the business to its present proportions, and cables made by this concern carry messages under every ocean on the globe.

But Mr. Roebling was also actively identified with a number of other industries. He was treasurer of the New Jersey Wire Cloth Co., president of the Union Mills Paper Manufacturing Co., vice-president of the Syracuse, Rochester and Eastern Railway Co., director of the Mechanics National Bank of Trenton, of the National Copper Bank of New York, of the Merchants and Metals National Bank of New York, of the Mercer Automobile Co., of the Otis Elevator Co., of the Trenton Street Railway Co., of the Interstate Railways Co., of the Trenton Brass and Machine Co., of the Standard Fire Insurance Co., of Trenton. Mr. Roebling's influence in the world of finance was nationally recognized. Several years ago he was selected as a director of the Equitable Life Assurance Society.

Mr. Roebling, though politically influential, never sought public office. He was a delegate to several Republican National Conventions, but he held no important office except as president of the Trenton Free Public Library, and as a member of the commission which built the Trenton City Hall. It was through Mr. Roebling's influence that the Free Public Library was instituted and built, and his interest in that institution continued up to the time of his death.

He had many hobbies. He was an enthusiastic hunter and fisherman. He won many prizes as a marksman. He was fond of automobiling. He conducted a chicken farm, and later interested himself in raising blooded cattle. He was one of the moving spirits in organizing the Trenton Country Club.

He was a man of strong likes and dislikes. His predominating characteristics were reserve and energy. He was a deep thinker and a man of few words. He loved companionship of

those in whom he was interested. He had decidedly individualistic ideas about all things, and he applied this trait in many striking ways. He used his wealth freely for the advancement of causes which appealed to him, but while some of his charities are known, he helped many causes, while enjoining secrecy.

Mr. Roebling was a member of the Union League of Philadelphia, the Engineers' Club of New York, the Lotus Club, the Trenton Country Club and of the Carteret Club of Trenton.

He is survived by two sons and two daughters, also by his mother, three brothers and one sister. His wife died several years ago.

KNOWN IN THE RUBBER STAMP TRADE.

Mrs. Margery S. Stewart, president and treasurer of R. A. Stewart & Co., Inc., New York City, dealers in hand stamp supplies, and president of the Hill-Independent Manufacturing Co., of Philadelphia, Pennsylvania, died in the latter city, after a long illness, March 6. She was born in New York City in 1863, was a graduate of Hunter College, and had been connected with the stamp trade as far back as 1881, and actively engaged in the business since 1900. She was an able business woman, personally directing the concerns with which she was connected, and besides this, was actively engaged in practical philanthropic work, in which she made many friends who deplore her loss.

FORMERLY IN THE RUBBER TRADE.

William Dwight Shattuck died at Boston, Massachusetts, March 19, aged 55 years. He was born in Roxbury, now a part of Boston, and for a number of years was connected with the boot and shoe business there and in Newburyport. Later, for a number of years, he was with Parker, Stearns & Co., manufacturers of druggists' and surgical sundries, Brooklyn, New York, leaving their employ about four years ago to locate at Spofford, New Hampshire, to superintend the interests of E. Ward Stearns, of the above named firm, who owns a hotel at that place. Mr. Shattuck was a member of several Masonic bodies. He is survived by a sister. Interment was at Spofford, New Hampshire.

FORMERLY A RUBBER STAMP MANUFACTURER.

George Moss, for several years a rubber stamp manufacturer in New York City, died at his residence in Brooklyn, New York, March 21, aged 58 years. He was a member of several Masonic bodies, and had attained to the thirty-second degree. He left a widow, three sons and a daughter.

RED OXIDE OF IRON COMING FROM SPAIN.

Notwithstanding the great production of red oxide of iron in the Marquette region of Lake Superior, so heavy has been the demand that a steady increase is noted in imports of this mineral pigment from Spain. The beginning of this movement was a single shipment, in 1901, to the value of \$52.50. In 1905 the figures had grown to \$870, and in 1910 had increased to \$5,186. Since then, shipments have rapidly increased, and in the first nine months of 1916 shipments of this substance to the value of \$55,588 had been made, and a far greater record would have been shown for the year had there been normal shipping accommodation.

This enormously increased demand is caused by its being substituted for red oxide of lead, not only for paint manufacture but also in many industries. Red lead is quoted at about \$350 a metric ton, while Spanish red oxide of iron is sold around \$27 per metric ton. Malaga is the principal port of export.

Interesting Letters from Our Readers.

RUBBER PACKING SUGGESTIONS FROM AN EXPERT.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I read with great interest in your issue of January 1, 1917, the advice given by The Rubber Club of America, Inc., about plantation rubber packing, and I am quite sure that the suggestions will be useful. Of course it stands to reason that the suggestions made by the manufacturers deal only with the manufacturing side of the question, and it will be impossible for many growers to deal with some of them in a practical way.

Allow me to give you my views on the subject.

No. 1. Experience has proved that in the tropics neither paper, cloth, straw nor dry leaves should be placed inside a package to contain crude rubber, either wild or plantation. Therefore, I cannot agree with suggestion No. 2, viz., that rubber should be packed in muslin. It is suggested in No. 3 that boxes should be made to hold 200 to 300 pounds. It is quite impossible to ask rubber growers to make a general rule of this; it is a question of transport. The best weight to adopt is what the average adult coolie can handle somewhat by himself. On the other hand, too much rubber in a parcel brings a pressure on the stuff, which for some grades is not at all beneficial. The size adopted by the Venesta chest is practical, and meets most of the requirements. It is both light and very strong.

In No. 17 I notice that some species of tropical woods are suggested. I am of the opinion that some of our tropical woods are of a too hard and breakable character.

No. 21 is very good advice indeed, viz., "store away from the boiler," but I should add "and the sun."

Talc or soapstone should be freely used in chests when placing the rubber inside.

The great enemies of crude rubber, either plantation or wild, are: The tropical sun, a bad warehouse, defective packing and bad curing.

G. VAN DEN KERCKHOVE.

London, February 15, 1917.

AMERICAN CAPITAL IN EASTERN PLANTATIONS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Like the United States, as recounted in THE adverse views expressed through the columns of newspapers here on the so-called "American invasion" in the field of rubber production in the Malay Peninsula. But few, if any, editorials or written opinions I have seen so far have apparently considered what such a vast and permanent improvement as the conversion of thousands of acres of waste jungle lands would be, not to mention the great expenditure of foreign gold this conversion would require. It would be outside foreign capital not earned nor coined in the Far East, but voluntarily expended here in wages and materials; also the extra capital it would take to operate the plantations for all future time, which would mean a large and continual expenditure in payrolls for the employment of labor and upkeep, which, in a measure, would mean continued prosperity.

The sale of the product of the present plantations would not be disturbed, as the demand of factory consumers of the world, and especially in America, keeps apace, indeed, if not in advance of the production. In the interim between planting and maturing the trees to bearing, this locality would have the use of the large sums so expended in the project, which in itself would mean a degree of prosperity.

Do the inhabitants of this most (rubber) favored spot on earth realize how much America has contributed to their prosperity?

Do they realize what is the cause of the American demand for rubber? Are they expressive of appreciation for the unbroken stream of gold flowing from America into their exchequer and thus making many millionaires here?

Let me direct attention to the year 1916. The most accurate figures obtainable at this time show there was probably an excess of 160,000 tons of plantation rubber produced in the Far East, most of it on this peninsula. Seventy per cent, or 112,000 tons, was consumed by America. This is 250,880,000 pounds. It was marketed (conservative estimate) at 60 cents gold "all in" per pound, for which America paid \$150,528,000 gold—over £30,000,000. Is there any thinking citizen opposed to her further contribution and building up in permanent improvement portions of this peninsula, where man-eating tigers and crocodiles now reign supreme?

The cause of the demand for rubber by America is the automobile, where 83 per cent of the world's supply is manufactured. Yet the British Government has passed recently laws so levying taxes against American automobiles as to hamper if not discourage their importation into portions of its dominions and dependencies, and gives as a reason the discouragement of luxurious extravagance of its citizens during war times. I am informed in the dependency of India further importation of American automobiles is prohibited. The result cannot but be a discouragement of America's rubber purchases which the tabooed automobile encourages. Is it not, indeed, an indirect expression of unappreciation of what America has done and is doing for the rubber industry and the Malay Peninsula?

Singapore, January 7, 1917.

JESSE E. LA DOW.

KLINGERIT SUBSTITUTES IN ENGLAND.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Like the United States, as recounted in THE INDIA RUBBER WORLD of March 1, 1917, England and France felt the need of Klingerit high-temperature steam packing soon after the beginning of hostilities in Europe which cut off the source of supply in Austria and Germany. Our asbestos firms had undertaken its production many years ago with considerable success, but none of the rubber works had been able to compete with the imported article. Exactly what success those rubber firms who took up its manufacture two years ago have attained does not yet seem to have become common knowledge. A great difficulty was the analysis, which was difficult and, indeed, by many chemists considered impossible.

A few months ago, however, I was interested to note that M. Dubosc in "Le Caoutchouc & la Gutta-Percha" gave the results of an analysis of Klingerit as follows: Asbestos, 80.46 per cent; flax, 2.24 per cent; rubber, 5.19 per cent; balata, 11.97 per cent; sulphur, 0.13 per cent. The rubber and balata form the agglutinant whereby the compound layers of asbestos mixed with flax fibers are held together. The interesting point about this analysis is that rubber and balata figure separately with the meticulous accuracy of the second place of decimals. I do not wish in my ignorance to throw any doubt on the analyst, but I always understood that no method was available by which the balata content of a rubber compound could be accurately determined. When it is known that they occur together—and that they do so in Klingerit is generally understood—it has been possible to give a rough approximation of the amount of each, but Weber's statement that our knowledge does not permit us to separate them is generally accepted, though of course rubber analytical methods have made great advances since Weber's book was written.

A RUBBER STUDENT.

London, March 15, 1917.

News of the American Rubber Trade.

SIXTEEN DIRIGIBLES FOR THE NAVY.

THE Navy Department of the United States Government has ordered 16 dirigible airships for coast and harbor patrol work, at a cost of \$649,250. These are to be of the non-rigid type, 160 feet long, 31½ feet in diameter, or 50 feet high over all, and will be equipped with 100-horsepower motors, capable of making a continuous flight of 16 hours at 35 miles per hour and a maximum speed of 45 miles for 10 hours.

The awards were as follows: Curtis Aeroplane Co., Buffalo, New York, three for a total of \$122,250; Connecticut Aircraft Co., New Haven, Connecticut, two for \$84,000; The B. F. Goodrich Co., Akron, Ohio, two for \$83,000, and The Goodyear Tire & Rubber Co., Akron, Ohio, nine for \$122,250.

HOOD RUBBER CO. REPORT.

Following is the condensed balance sheet of the Hood Rubber Co., Watertown, Massachusetts, dated December 31, 1916:

ASSETS.	
Plant (real estate, machinery, etc.)	\$2,900,000.00
Merchandise	1,846,308.71
Accounts receivable	3,381,810.80
Cash	318,180.68
Investments in other corporations	159,400.00
Patents	1,000.00
	\$8,606,700.19
LIABILITIES.	
Capital stock—Common	\$2,500,000.00
Preferred	2,750,000.00
	\$5,250,000.00
Notes payable	2,280,000.00
Surplus	1,076,700.19
	\$8,606,700.19

Merchandise in process of importation and letters of credit and drafts discounted in connection therewith are not included in the foregoing statement.

AMERICAN CHEMICAL SOCIETY MEETING.

The general meeting of the American Chemical Society, to be held in Kansas City, Missouri, April 10 to 14, promises to be one of the most interesting in the history of that organization. It will be the first for many years held in that section, where are situated many of the nation's chemical industries, especially those relating to natural gas, petroleum and zinc. There are to be symposiums on these subjects, and important excursions are planned for personal visits and investigations in the fields above mentioned, as well as visits to industrial plants with which chemistry is more or less closely allied. The local committee is headed by W. A. Whitaker, of the University of Kansas, Lawrence, Kansas, chairman of the executive committee.

DOMINION RUBBER SYSTEM CHANGES.

A recent announcement of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, reports the following appointments, effective February 12:

R. E. Jamieson, director in charge of sales of Dominion Rubber System; J. M. S. Carroll, sales manager, Dominion Rubber System; F. A. Todd, general credit manager, Dominion Rubber System; Hugo Wellein, division manager, Quebec division; Geo. Bergeron, assistant division manager, Quebec division; H. R. Nixon (St. John branch) becomes chief clerk to director in charge of sales at head office; and A. R. Hannah, office manager, St. John branch.

The rapid expansion of business in western Canada has made necessary a rearrangement of the Middle West division. Two new divisions have been created, with a result that each prairie province has become a distinct unit:

Alberta Division—Division office, Calgary, Alberta; division manager, A. C. McGiverin; office manager, J. C. Jones.

Saskatchewan Division—Division office, Regina, Saskatchewan;

division manager, L. T. McGiverin; office manager, Frank Garnett.

Manitoba Division—Division office, Winnipeg, Manitoba; in charge of Charles Holden, western sales manager; office manager, J. H. Rice.

ASSOCIATION SPONSORS BRAKE LINING TESTS.

The Asbestos Brake Lining Manufacturers' Association, Ambler, Pennsylvania, organized July 28, 1916, endeavors to aid manufacturers' interests by bettering the service to the trade in general, and is now preparing the way for disinterested testing of all brake band linings. This work will be done by recognized experts, and is expected to demonstrate that brake lining of a certain stipulated construction, quality, etc., is best suited for given requirements. The Society of Automobile Engineers has been invited to cooperate and it is hoped to render a real service to the motoring public at large.

The president of this association is A. H. Burdick, treasurer of the Standard Woven Fabric Co., Walpole, Massachusetts, and the secretary-treasurer is C. J. Stover, vice-president of Keasbey & Mattison Co., Ambler, Pennsylvania.

RUBBER COMPANY'S DIVIDENDS.

The Goodyear Tire & Rubber Co. paid its usual quarterly dividend of 3 per cent on the common stock on March 1.

The New Jersey Zinc Co. paid an extra 4 per cent dividend on March 10.

The Fisk Rubber Co. paid a quarterly dividend of 1¼ per cent on second preferred stock on March 15 to stockholders of record January 31.

The Ajax Rubber Co., Inc., paid a quarterly dividend of \$1.25 on March 15 to stockholders of record February 28.

The Pennsylvania Rubber Co. has declared a quarterly dividend of 1½ per cent on common and 1¾ per cent on preferred stock, payable March 31 to stockholders of record March 15.

The Kelly-Springfield Tire Co. has declared a quarterly dividend of \$1.50 per share on preferred stock, payable April 2 to stockholders of record March 17.

The Rubber Goods Manufacturing Co. paid a quarterly dividend of 1¾ per cent on preferred stock on March 15 to stockholders of record March 10.

The board of directors of the Keystone Tire & Rubber Co. has declared a quarterly dividend of 2 per cent with an additional ¼ per cent upon preferred stock and a regular quarterly dividend of 3 per cent on common stock, payable April 2 to stockholders of record March 23.

The Federal Rubber Co. has declared a quarterly dividend of 1¾ per cent on first preferred stock, payable April 1 to stockholders of record March 17.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on March 26 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle Street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new).....	67½	69
Firestone Tire & Rubber Co., common.....	141	143½
Firestone Tire & Rubber Co., preferred.....	107	109
The B. F. Goodrich Co., common.....	55¼	56
The B. F. Goodrich Co., preferred.....	108¾	112
Goodyear Tire & Rubber Co., common.....	230	235
Goodyear Tire & Rubber Co., preferred.....	106	107
Kelly-Springfield Tire Co., common.....	63	63½
Kelly-Springfield Tire Co., preferred.....	93	94
Miller Rubber Co., common.....	230	240
Miller Rubber Co., preferred.....	105	106
Portage Rubber Co.....	179	182
Swinchart Tire & Rubber Co.....	78½	83
United States Rubber Co., common.....	59	59½
United States Rubber Co., preferred.....	108	108½

TRADE NOTES.

The capital stock of the Ohio Rubber Co., Cleveland, Ohio, has been increased from \$300,000 to \$400,000, to care for a growing volume of business. This company also operates branches at Cincinnati, Ohio, and Detroit, Michigan.

The Brighton Mills, manufacturer of cotton and special fabrics, Passaic, New Jersey, has increased its capital stock from \$3,000,000 to \$4,500,000, \$1,500,000 of this increase being in preferred and \$3,000,000 in common stock. The company states that owing to the enhanced value of raw material and finished products, this additional capital is needed to finance the business properly.

The Dryden Rubber Co., Chicago, Illinois, has just completed a large two-story addition of reinforced concrete construction to care for the marked increase in its fiber sole and rubber heel business.

At the recent annual meeting of the I. B. Kleinert Rubber Co., New York City, officers were elected as follows: Victor Guinzburg, president; H. A. Guinzburg, vice-president and treasurer, and A. B. Salinger, secretary.

Alterations and improvements now in progress at the plant of the Chicago Insulated Wire & Manufacturing Co., Sycamore, Illinois, will cost approximately \$75,000, and include many new machines of special designs.

The Dupont Fabrikoid Co., which recently purchased the plant of the Fairfield Rubber Co., Fairfield, Connecticut, is erecting a large addition to that plant. The enlargement is an extensive one, and it is expected that it will not be completed for several months.

The New Jersey Zinc Co., New York City, has elected the following directors: Charles W. Cox, William P. Hardenbergh, August Hecksher, Thomas D. Jones, Edward S. Marston, Edgar Palmer, John J. Riker, Edwin M. Squier and A. B. Schultz.

The United States Rubber Co., New York City, will open two new branches shortly. One, in Manila, Philippine Islands, will be in charge of Charles E. Guest, formerly with the Mexican branch of the business. This new office will handle a portion of the Oriental trade of the company, hitherto under the direction of the San Francisco, California, branch. The other branch, in Australia, will be under the management of J. A. McKenzie.

The Winnsboro Mills, Winnsboro, South Carolina, formed last summer under South Carolina laws to take over the Fairhaven Mill of the Hampden Cotton Mills Co., has changed to a Massachusetts corporation, increasing the capital stock to \$900,000. On February 1 work began on a large addition to the plant, and when this is completed, probably about July 1, the product will be changed from print cloths to novelty tire fabrics. Ten thousand new spindles will be installed, bringing the total up to 35,000. Five hundred looms are now operated, and this number will be increased, although to what extent is not known at this time. J. Pennington Gardiner, 60 Federal street, Boston, Massachusetts, is the purchasing agent for the company, which is under the management of Lockwood, Greene & Co.

The board of directors of The Barrett Co., New York City, has voted to increase the capital stock of the company from \$20,000,000 to \$37,500,000, such stock when increased to consist of \$25,000,000 of common stock divided into 250,000 shares and \$12,500,000 of preferred stock divided into 125,000 shares of the par value of \$100 each.

J. Early Wood, Inc., manufacturer and exporter of chemicals, New York City, has taken over the exclusive sales control of the L. & R. Organic Products Co., Inc., of Elizabeth, New Jersey, which manufactures nigrosine. The Wood company's own line includes several shades of spirit, oil and water soluble material in powder and crystals.

The Ravenna Rubber Co., Ravenna, Ohio, has increased its capital stock from \$100,000 to \$250,000. This additional capital is needed to finance the increased volume of business resulting from the company's purchase of the entire druggists' sundries

equipment of The Star Rubber Co. The officers and directors of the Ravenna company are as follows: S. K. Elliott, president and treasurer; R. W. Beebe, secretary; L. A. Ritzman, E. H. Sniffin, K. M. Elliott and M. H. Beebe. An existing vacancy in the directorate will be filled at the next meeting of the company.

The New York City sample room of the Davol Rubber Co., Providence, Rhode Island, has been removed from 299 Broadway to 302 Broadway, where more commodious quarters and better facilities for display are afforded.

The Rubber Waste Co., New York City, will be located temporarily at 247 East One Hundred and Thirty-seventh street, pending the completion of its new office and warehouse at Lincoln avenue and One Hundred and Thirty-fifth street.

The Seamless Rubber Co., New Haven, Connecticut, has been placed in the hands of a receiver, Vernal W. Bates, on an application in which 97 per cent of the creditors joined.

Lockwood, Greene & Co., Boston, Massachusetts, announce the resignation of P. T. Jackson, Jr., as an officer of the Bay State Cotton Corp., Lowell, Massachusetts, and Boston Yarn Co., Boston, Massachusetts, to associate himself with other interests, and the appointment of Allan B. Greenough as treasurer of the Bay State Cotton Corp. and president of the Boston Yarn Co.

The Passaic Cotton Mills, Passaic, New Jersey, has acquired the remaining cotton mills of the New England Cotton Yarn Co., at New Bedford, Massachusetts. They are equipped with 36,000 spindles for the manufacture of tire fabrics. The plant will be operated under the name of the New Bedford Spinning Co., recently incorporated under Massachusetts laws with a capital of \$200,000.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[286.] A correspondent wishes to be placed in touch with manufacturers of a magnetic separating machine for separating rubber from wire.

[287.] A complete estimate is desired of machinery needed for the manufacturing of rubber heels, soles and similar goods, based on using guayule rubber.

[288.] A Japanese company desires to import reclaimed rubber, substitutes, and chemicals for rubber manufacturing; and is also in the market for tire machinery and machinery for proofing fabrics.

[289.] A consumer desires to place an order for red atomizer bulbs.

[290.] Names of makers of golf-ball machinery are requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A firm in Switzerland is in the market for india rubber cloth for printers. Report No. 23,870.

A shoe dealer in Spain wishes to purchase rubber soles and heels. Report No. 23,878.

Representation of American manufacturers and exporters of druggists' sundries is sought by a firm in Colombia. Report No. 23,971.

Catalogs and full information from American manufacturers of rubber raincoats are desired by a firm in Java. Report No. 24,003.

An agency is desired in Spain for boxes of rubber type, rubber stamps, etc. Report No. 24,040.

An applicant in the West Indies desires to be placed in communication with American manufacturers of elastic webbing. Report No. 24,043.

PERSONAL MENTION.

Charles R. Sargent, formerly connected with Innis, Speiden & Co., has severed his connections with that concern and entered the firm of Stresen-Reuter & Hancock, Inc. The latter company has opened offices and a warehouse at Cleveland, Ohio, where Mr. Sargent will maintain headquarters.

R. J. Parkell, formerly connected with the Hoffman-La Roche Chemical Works, is now associated with the St. George Chemical Co., Inc., 99 John street, New York City, as manager of the chemical department.

Frank A. Mayo, for 18 years manager of the rubber shoe department of Clark-Hutchinson Co., wholesale shoe merchants, Boston, Massachusetts, has tendered his resignation, to become vice-president and treasurer of H. B. Hanford & Co., leather and rubber footwear wholesalers, Philadelphia, Pennsylvania.

W. F. Enright, manager of the Minneapolis branch of the United States Rubber Co., New York City, was a speaker at the first annual convention of the Minnesota Retail Shoe Merchants' Association at Minneapolis last month. J. J. Hawkins, president of the Standard Shoe & Rubber Co., another speaker, gave an interesting talk on the rubber trade and explained the process of manufacture of rubber footwear, exemplifying this process by making a rubber boot before his audience.

Earle Brothers, New York City, announce that Russell W. Earle has become a member of the firm.

F. Y. Horn has been appointed district manager for the Amazon Rubber Co., Akron, Ohio, in the Central West, with headquarters at Chicago, Illinois.

Harry T. Dunn, president of The Fisk Rubber Co., Chicopee Falls, Massachusetts, has resigned his position of vice-president of the Willys-Overland Co., of Toledo, Ohio, to give his attention solely to the tire business of the Fisk company, and of the Federal Rubber Co., of Cudahy, Wisconsin, of which he is also president.

John W. Maguire, for several years Chicago branch manager for the Republic Rubber Co., Youngstown, Ohio, has resigned that position to become general sales manager of the Brunswick-Balke-Collender Co., Chicago, Illinois.

A. W. Senz, manager of the Chicago, Illinois, branch of The Gordon Tire & Rubber Co., has been transferred to the main office of the company at Canton, Ohio, as manager of sales of the tire and tube department, and is succeeded by C. H. Kenyon, late with the Ajax Rubber Co.'s Chicago branch.

A. I. Butler, formerly with the Batavia Rubber Co., Batavia, New York, succeeds W. A. Young, former manager of the New York City branch of The Gordon Tire & Rubber Co. Canton, Ohio.

W. H. Batcheller, president of the Akron Tire Co., Inc., of New York City, has been touring through the South by motor car, spending most of the winter in Florida. He speaks highly of the excellent roads now finished and others being built and resurfaced in that State.

Percy W. Rairden has been appointed sales manager for the Savage Tire Corp., of San Diego, California. Mr. Rairden brings to the Savage company a broad business experience, including first-hand knowledge of conditions in the foreign rubber-producing centers.

MCGRAW COMPANY APPOINTMENTS.

Changes in the personnel of the McGraw Tire & Rubber Co., East Palestine, Ohio, are as follows: R. G. Nelson has been made assistant sales manager, with headquarters at East Palestine. W. V. Logan, former district manager at St. Louis, Missouri, is now district manager of the New York territory, being succeeded in St. Louis by C. E. Pumphrey, former district manager of the Atlanta, Georgia, territory. Former representative, T. J. Harris, succeeds Mr. Pumphrey.

CANADIAN CONSOLIDATED BOND ISSUE.

At a special general meeting of shareholders of Canadian Consolidated Rubber Co., Limited, held at the head office, Montreal, on February 14, the directors were authorized to issue first and refunding mortgage gold bonds to the amount of \$8,000,000. This issue is to retire debentures amounting to \$2,500,000, which fall due in 1918, to liquidate bank advances and to provide funds for further expansion of business.

The Canadian Consolidated Rubber Co.'s business has expanded far beyond the ideas entertained when the first financing was carried out in 1906. This expansion necessitated temporary financing measures from time to time. The present issue of bonds consolidates this financing and permits continued growth.

ADDITION TO STANDARD UNDERGROUND CABLE CO.'S PLANT.

The Standard Underground Cable Co. of Canada, Limited, is making an addition to its factory at Hamilton, Ontario, which, when completed and equipped with the necessary machinery, will represent an investment of \$50,000.

The new structure will be devoted exclusively to the uses of the wire drawing department and consists of one story with



basement built of brick and concrete and is 125 by 120 feet in dimensions, which gives a total increase in floor space of 30,000 square feet. It is most modern in type and equipped to secure the lighting, heating and ventilation necessary to the best working conditions. Ample fire protection apparatus is also provided for, which includes a complete automatic sprinkler system.

CROMPTON & KNOWLES ELECTIONS.

At the recent annual meeting of the Crompton & Knowles Loom Works, Worcester, Massachusetts, Charles H. Hutchins retired as president of the concern and Lucius J. Knowles was elected to succeed him.

Other officers and directors elected are: Vice-presidents, Earl E. Howard, Irving H. Verry and Frederic W. Howe; treasurer, Edward F. Green; assistant treasurer, Fred J. Bowen; clerk, Earl E. Howard; general manager, John F. Tinsley; general counsel, Charles M. Thayer.

KELLY-SPRINGFIELD TIRE CO.

The Kelly-Springfield Tire Co., New York City, has purchased the Northland Rubber Co. plant at Buffalo, New York. The Kelly-Springfield company is to build at Cumberland, Maryland, but the purchase of the Buffalo plant will enable an immediate increase in production for the present season, pending the completion of the Cumberland plant.

At the annual meeting of the company held on March 13, at 15 Exchange place, Jersey City, New Jersey, directors were re-elected as follows: Van H. Cartmell, Stephen Peabody, Arnold L. Scheur, Jacob Oppenheim, Gustavus Maas, Austin M. Poole, Frederick A. Seaman, and Otis R. Cook.

NEW INCORPORATIONS.

American Tire Filler Co., January 11 (Washington), \$300,000. W. J. Michelet (president), Portland, Oregon; Fred Watson (vice-president), Tacoma; R. S. Wicks (secretary and treasurer), Mt. Vernon—both in Washington. Principal office, Mt. Vernon, Washington. To manufacture tire fillers, tires and accessories.

Appleton, F. H., & Son, Inc., March 3 (Massachusetts), \$400,000. Francis H. Appleton, Francis H. Appleton, Jr., and Frank Tent—all of 185 Summer street, Boston, Massachusetts. Rubber reclaiming, and to manufacture and deal in rubber and rubber compounds, substitutes and products, including boots, shoes and rubber goods.

Automatic Eraser Co., Inc., March 20 (New York), \$10,000. Edward Lewers, Edward N. Walter and Dewitt C. Moore—all of 29 Broadway, New York City. To deal in office supplies.

Blackstone Tire & Rubber Co., Inc., March 13 (New York), \$3,000. Walter Loewenthal, 35 Nassau street, New York City, and C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York.

C. A. Breitenstein Tire Corporation, March 1 (New York), \$55,000. C. A. Breitenstein, M. R. Breitenstein, F. H. Robbins—all of 528 Greene avenue, Brooklyn, New York.

Cleveland Standard Tire & Rubber Supply Co., February 14 (Pennsylvania), \$10,000. John C. Sinn, Pittsburgh, and George R. Mailey and Myles McConnon, Homestead—both in Pennsylvania. Principal office, Pittsburgh, Pennsylvania. To manufacture and deal in automobiles, accessories, etc.

The Colonial Rubber Co., February 20 (Massachusetts), \$25,000. John J. Conway, 503 Huron avenue, Cambridge, and Charles B. Hamilton and Elsie O. Hamilton, 56 East Walnut street, Taunton—both in Massachusetts. To manufacture rubber heels and soles, chemicals and footwear, and to do and deal in rubber reclaiming.

Commonwealth Tire Corporation of America, March 14 (Delaware), \$2,500,000. Martin E. Smith, T. Morley Smith and Artemas Smith—all of Wilmington, Delaware. Principal office Wilmington, Delaware. To manufacture master aluminum automobile tires.

Curtis Tire Co., Inc., March 21 (New York), \$10,000. Harry E. Loveless, Harry Whittaker and Syd Elin—all of 354 Amsterdam avenue, New York City.

Errickson-Priddy Tire Co., February 12 (Oklahoma), \$12,000. C. A. Errickson, S. E. Priddy, J. S. Twombly and J. E. Errickson—all of Ardmore, Oklahoma. Principal office, Ardmore, Oklahoma. To deal in automobile accessories and to conduct an automobile repair shop, etc.

Insulation Development Corporation, March 14 (New York), \$5,000. Edward Rose, Eugene Lawler and Martin Dillon—all of 2 Broadway, New York City. Wire insulating, etc.

Kipp Inner Tube Repair, Inc., February 27 (New York), \$25,000. B. F. Klass, 523 West One Hundred and Fifty-second street; G. J. Heyson, 227 West One Hundred and Eighteenth street, and N. J. Jewel, 250 Manhattan avenue—all in New York City.

A. H. Langford, Inc., March 9 (New York), \$10,000. A. H. Langford, 8 Centre avenue, New Rochelle, New York. F. J. Farnell, Providence, Rhode Island, and B. C. Elliott, 1400 Broadway, New York City. Principal office, New Rochelle, New York. To manufacture rubber tires, etc.

Leader Tire & Rubber Co., Inc., February 27 (New York), \$5,000. Sydney Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York. Repairs, etc.

Life Preserver Suit Co., Inc., March 5 (New York), \$1,000,000. Louis S. Bruenn, 254 West Seventy-sixth street; Ladislaus Von Keviczky, 256 West Ninety-seventh street, and A. E. Puckrin, 175 Claremont avenue—all in New York City. To manufacture life-saving suits and apparatus.

Pacific Rubber Co., January 22 (California), \$50,000. John Hauerwaas, E. C. Austin, W. H. Preston, L. S. Rounsaville and Roy R. Meads—all of Los Angeles, California. Principal office, 433-5 West Pico street, Los Angeles, California. To deal in automobile tires and accessories.

Para Rubber Products Co., February 27 (New Jersey), \$30,000. Frederic W. Rogers and Edward C. Goldfarb, 40 Exchange Place, and H. H. Waller, 140 Nassau street—both in Manhattan Borough, New York City. Principal office, 70 Washington street, Bloomfield, New Jersey. To manufacture and deal in rubber goods.

Paraloid Works, Inc., March 22 (New York), \$80,000. Hugo L. Schneider, Hastings-on-Hudson, New York; Frederic C. Pitcher and Samuel L. Jackson—both of 111 Broadway, New York City. To manufacture rubber, etc.

Paramount Puncture-Proof Tire Co., Inc., March 6 (New York), \$100,000. H. Levy and M. P. Hartman, 37 Liberty street, and S. Kraft, 30 Church street, both in New York City.

Powhatan Metal, Iron and Rubber Co., Inc., March 8 (New York), \$1,000. Louis Milansky, Samuel Milansky and Philip Milansky—all of 199 East Third street, New York City. To deal in junk.

Quick Tire Service, Inc., March 19 (New York), \$10,000. Russell Goldman, 1190 Madison avenue; A. G. Thaanum, 112 Haven avenue—both in New York City, and A. Foshay, 49 Pulaski street, Brooklyn, New York. Tire repair and sales station.

Reliable Tire and Repair Co., The, March 1 (Ohio), \$15,000. F. A. Kline, G. F. Kline, Charles Selby, I. L. Holderman and Lester Selby—all of Dayton, Ohio. Principal office, 305 West Third street, Dayton, Ohio. Tires, tubes and accessories.

Ronback, Walter A., Co., Inc., March 15 (New York), \$5,000. P. W. Smith, 2103 Ocean avenue; Walter A. Ronback, 1657 East Eighth street—both of Brooklyn, New York, and Harry S. Jaeger, Patchogue, New York. To manufacture tires, autos, supplies, etc.

Rubber City Clearing House Co., The, February 7 (Ohio), \$100,000. A. H. Noah (president), C. E. Wilcox (vice-president), R. H. Noah (secretary and treasurer), and C. E. Williams (general manager). Principal office, 1033-1035 South High street, Akron, Ohio. To deal in tires.

Rubber Goods Manufacturing Co., February 10 (Illinois), \$50,000. E. S. Williams (president), 524 Fifth avenue; Samuel Norris (secretary), 45 East Sixty-first street, New York City. Principal office, 112 West Adams street, Chicago, Illinois. To deal in rubber products of all kinds.

Security Tube Co., of New Jersey, The, March 14 (New Jersey), \$50,000. James F. Lynch, Joseph Immerman and Eliot Norton—all of 2 Rector street, New York City. Principal office, 14 Chestnut street, Rutherford, New Jersey. To deal in automobile accessories, including tires and tubes of all kinds and description.

Smith, Howard B., Inc., March 19 (New York), \$50,000. J. A. Van Arsdale, 22 Soldiers Place; W. F. Hofheins, 585 Breckinridge street, and Allen Keeney, 33 Franklin street—all of Buffalo, New York. To deal in tires and rubber goods.

Temple Tire & Supply Co., Inc., February 14 (Pennsylvania), \$50,000. John H. Risbeck (president), James D. Pasho (vice-president), John H. Giles (secretary), C. L. Barnett (treasurer)—all of Pittsburgh, Pennsylvania. Principal office, 628 Penn avenue, Pittsburgh, Pennsylvania. To manufacture and deal in automobile tires, accessories, etc.

Vernon Tire & Rubber Co., Inc., The, March 12 (New York), \$25,000. Arthur M. Gross (secretary), 22 Wilson Place; Louis Silverstein, 18 Wilson Place, and Edward A. Patch, 515 South Seventh avenue—all of Mount Vernon, New York. Principal office, Ninth avenue and Sixth street, Mount Vernon, New York. To manufacture tires, rubber soles and heels, etc.

TRADE NOTES.

The Mansfield Tire & Rubber Co., Mansfield, Ohio, has raised its capital stock from \$200,000 common and \$100,000 preferred to \$800,000 common and \$450,000 preferred, of which all the common stock and \$200,000 of the preferred has been subscribed for and paid in, this additional capital providing for the increased demands for Mansfield tires.

A new concern in Fort Worth, Texas, is the Texas Tire & Rubber Co., formed for the purpose of doing a general automobile tire business. This company also operates a Goodyear service station. John Edward Gill is the manager.

The Cupples Co., formerly Samuel Cupples Woodenware Co., St. Louis, Missouri, is manufacturing a rubber tire with a rough safety tread of reversed and staggered C's; also the Rhinos patented inner tube which is made in fairly heavy thickness with fabric insert and is molded and cured in the exact size and exact form of the inside of the casing for which it is intended. This company produces about 400 tires and tubes a day and plans are now under way for doubling this production.

The Lee Tire & Rubber Corp., Conshohocken, Pennsylvania, is now making double the number of tires it turned out last year at this time. January's output was reported as 18,000 tires, February, 26,000, and in March the production was estimated to aggregate 30,000 tires.

The Triple Airless Tire Co., Butler, Pennsylvania, has increased its capital stock from \$50,000 to \$150,000, this increase to include the United States, France, Germany, Great Britain and Canada patents.

The Boone Tire & Rubber Co. is establishing a plant at Chippewa Falls, Wisconsin, for the manufacture of approximately 200 casings and 200 tubes per day. Five 7-platen presses will also be installed for the manufacture of rubber soles and heels, together with a 5-ton capacity reclaiming plant. A portion of this equipment has already been ordered.

Attorney H. C. Koehler has been appointed receiver for the Alliance Rubber Co. and the Alliance Tire & Rubber Co., of Alliance, Ohio. The property will not be operated under the receivership, but will be appraised with the assets of the company, and as soon as an order of the court can be obtained the property and plant as a whole will be sold. The Alliance Rubber Co. was organized in March, 1913, and in 1916 a reincorporation was effected, with an increase in capital from \$58,000 to \$2,500,000, and the name changed to that of the Alliance Tire & Rubber Co.

The Peerless Tire & Rubber Co., Portland, Oregon, has been formed as a tire distributor and also maintains a well-equipped tire repair shop. Albert Courts is sole owner of the company.

The Marathon Tire Co. is owned by Clark C. Wortley, who is opening up a jobbing business in "Marathon" tires for the State of Iowa, with headquarters at Des Moines. Mr. Wortley expects shortly to open up branch retail stores in all the large cities in Iowa and will also sell to dealers.

The Reliable Tire & Repair Co., Dayton, Ohio, notice of whose incorporation appears elsewhere in this issue, will erect a new building in the automobile district of Dayton, 125 feet long, 39 feet wide and two stories high, with every facility for carrying on its business along the most modern lines. Fred A. Kline is secretary and general manager of the company.

The newly reorganized Dreadnaught Tire & Rubber Co., of Baltimore, Maryland, is making arrangements for a largely increased output of its tires and inner tubes, and has appointed Charles F. U. Kelly to take charge of the sale and distribution. H. Lawton Pettingell will be one of the heads of the sales organization, continuing his association with Mr. Kelly. The new organization is starting out on an aggressive policy. New ma-

chinery and equipment have been provided, capable of doubling the former capacity of the plant, and plans have been formulated for the erection of new buildings to take care of the anticipated increase of business. The headquarters of the sales department are 1834 Broadway, New York City.

The Racine Auto Tire Co., Racine, Wisconsin, which has a present output of 300 tires and 350 tubes per day, is now breaking ground for a new factory, the first unit of which will give a capacity of approximately 1,500 tires per day. The site of the new plant is the old Wisconsin-Illinois baseball park, consisting of approximately four acres, which will allow for expansion in output to 5,000 or 6,000 tires a day. The officers of this company are: L. J. Elliott, president; J. H. Wright, vice-president; C. H. Wright, secretary and treasurer.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has opened a new branch and service station at 154 Rayen avenue, Youngstown, Ohio, in charge of A. J. Sharpe.

The Ardmore-Akron Tire & Rubber Co. will be the name of a new rubber manufacturing enterprise to be located at Ardmore, Oklahoma. John C. Harmony will be president and Charles BeSaw, vice-president and general manager. It is reported that Ardmore has guaranteed a bonus of \$75,000 cash and donated a 5-acre tract of land for the erection of the plant. Mr. BeSaw is the president of the BeSaw Rubber Co., of Hartville, Ohio.

A company has been organized at Bangor, Michigan, for the manufacture of a variety of articles from marl, a substitute for hard rubber. The officers of the new company are L. P. Walker, president, and Edwin Hickey, secretary.

The Palmer Rubber Tire Co., St. Joseph, Michigan, is located in the remodeled quarters of the old Truscott Boot Co. The company is said to be backed by Chicago capital.

R. B. Pierce is the new Cleveland, Ohio, manager for the Kelly-Springfield Tire Co. He was formerly connected with the company's Cleveland branch, but has spent the past year at the plant in Akron.

J. E. Lemmon, who has been connected with the Falls Rubber Co., Cuyahoga Falls, Ohio, has recently been appointed manager of the company's branch at Cleveland, Ohio.

The capitalization of the Gordon Tire & Rubber Co., Canton, Ohio, has been increased from \$600,000 to \$1,600,000. The increase was authorized by the stockholders to take care of future expansion.

The Keystone Tire & Rubber Co., New York City, is moving into new quarters in the "Keystone Building," at Broadway and Sixty-second street.

The National Tire & Rubber Co., East Palestine, Ohio, recently purchased by a syndicate of local capitalists prominently identified with the local rubber industry, will be operated without change of name. Rapid expansion of the business is anticipated. The officers of the new corporation are: C. L. Merwin, president; S. L. Warner, vice-president and general manager; R. B. Taggart, treasurer, and E. N. Herrick, secretary.

THE GREAT REPUBLIC TIRE COMPANY.

The Great Republic Tire & Rubber Manufacturing Co., Wilmington, Delaware, notice of whose incorporation appeared in the February issue of THE INDIA RUBBER WORLD, will presently increase its capital to \$2,500,000, \$1,000,000 of 7 per cent preferred stock and an issue of common stock to be offered for sale. The factory location has not been definitely decided upon but will be in Oklahoma or Texas. J. M. Owens, president of the company, owns large rubber interests in Mexico; W. H. Owens, vice-president and general manager, is a thoroughly experienced tire man, and J. L. Walker, secretary and treasurer, is well known as a wholesale dealer in hardware, automobiles, tires and accessories.

H. L. McCLAREN.

H. L. McCLAREN, who has recently been elected vice-president and sales manager of the Ajax Rubber Co., Inc., New York City, is a veteran in the tire business, his record



H. L. McCLAREN.

dating back to the days of Morgan & Wright, with whom he advanced to the position of sales manager for the Middle West, continuing in the same capacity with the United States Tire Co., which absorbed the business of that concern. In 1912 he became vice-president and general manager of the Racine Rubber Co., Racine, Wisconsin, and later, its president. His achievements with that firm induced the financial interests back of the Mitchell-

Lewis Motor Co., Racine, Wisconsin, to elect him president, and in this dual capacity he put the motor company on its feet and sextupled the business of the tire company.

The Ajax Rubber Co., Inc., recently purchased the business of the Racine Rubber Co., and now the products of both companies will be marketed separately under Mr. McLaren's direction. He has resigned his position with the Mitchell-Lewis Motor Co. and will devote his entire energies to the tire business, in which line his record has been a continuous and striking success.

THE FISK RUBBER CO. REPORT.

At the recent annual meeting of The Fisk Rubber Co., Chicopee Falls, Massachusetts, the following officers and directors were elected, all being re-elected except J. D. Anderson, who is a new addition to the board of directors: H. T. Dunn, president; H. G. Fisk, treasurer and clerk; E. H. Broadwell, G. A. Ludington, vice-presidents; R. B. McGaw, assistant treasurer; E. M. Bogardus, comptroller. Directors: H. T. Dunn, Toledo, Ohio; E. H. Broadwell, Longmeadow, Massachusetts; Stedman Buttrick, Boston, Massachusetts; J. D. Anderson, H. G. Fisk, G. A. Ludington, Fred T. Lev—all of Springfield, Massachusetts.

Following is the company's profit and loss report and statement of assets and liabilities for the fiscal year ending December 31, 1916. The total sales for the fiscal year were given as \$19,457,788.77.

ASSETS.

CAPITAL ASSETS:

Land, buildings, furniture and fixtures, Chicopee Falls, at depreciated value.....	\$4,779,447.70	
Factory equipment, branch furniture and fixtures at depreciated values.....	1,089,967.49	
Leasehold property.....	6,892.59	
Total capital assets.....	\$5,876,307.78	
Good will.....	8,000,000.00	\$13,876,307.78

Investments—

Premier Realty Co.....	\$112,040.04	
Company's first preferred stock held for retirement January, 1917.....	291,302.22	404,342.26

CURRENT ASSETS:

Inventories, raw materials and supplies, work in process and finished product.....	\$7,476,203.58	
Tires in use under mileage contracts.....	38,201.87	
Notes and accounts receivable, less reserve for doubtful debts and cash discounts.....	3,893,695.64	
Collateral notes from employees for subscriptions to capital stock.....	99,835.36	
Notes receivable for special deposits.....	1,380,600.00	
Cash in banks, on hand and in transit.....	367,088.20	13,255,624.65
Deferred charges—		
Prepaid rents, royalties, taxes, interest and insurance.....	170,023.10	
Stationery and office supplies.....	88,618.25	
Other prepaid expenses.....	21,837.48	260,478.83
		\$27,796,753.52

LIABILITIES.

CAPITAL STOCK OUTSTANDING:		
First preferred non-convertible.....	\$4,400,000.00	
First preferred convertible.....	5,000,000.00	
Second preferred convertible.....	4,500,000.00	
Common.....	8,000,000.00	\$21,900,000.00

CURRENT LIABILITIES:

Loans payable.....	2,150,000.00	
Accounts payable.....	682,293.58	
Accrued income tax and wages.....	37,764.23	
Dividends due, not paid.....	4,485.25	2,874,543.06
RESERVE ACCOUNTS.....		171,768.09
SURPLUS appropriated for retirement first preferred stock.....		975,000.00
SURPLUS per attached statement.....		1,875,442.37
		\$27,796,753.52

PROFIT AND LOSS AND SURPLUS.

SURPLUS, balance December 31, 1915.....		\$1,246,394.28
Add:		
Net profits for the year ending December 31, 1916, after deducting manufacturing costs, depreciation and interest on borrowed money.....	\$1,836,829.86	
Less unusual expenses absorbed.....	95,125.08	1,741,704.78
		\$2,988,099.06

DEDUCT—

Dividends paid, on first preferred stock.....	\$308,000.00	
On second preferred.....	140,000.00	\$448,000.00
SURPLUS appropriated for retirement of first preferred stock.....	\$375,000.00	
Premium paid on 3,750 shares first preferred stock retired.....	7,940.58	
Fees and expenses in connection with increase of capital stock.....	16,866.11	
Commissions paid on sale of 50,000 shares first preferred convertible stock and 5,000 shares of second preferred stock.....	275,000.00	\$1,112,806.69
Less miscellaneous stock profits.....	10,150.00	\$1,112,656.69
SURPLUS, balance December 31, 1916.....		\$1,875,442.37

J. & D. TIRE & RUBBER CO.

At the annual meeting of the J. & D. Tire & Rubber Co., Charlotte, North Carolina, held March 1, the following officers were re-elected: H. O. Smith, president; Thos. J. Northway, vice-president; C. C. Coddington, treasurer, and Lee A. Folger, secretary. These, together with H. S. Leyman, W. G. Welbon, John L. Dabbs, and E. Thomason, constitute the board of directors.

The company's new plant just completed consists of three buildings of concrete and glass construction, two main buildings, with the mill room in a one-story structure in the center. The arrangement is such that additional buildings and equipment may be developed up to a capacity of 2,000 tires per day without any rearrangement of the present plant. The machinery is electrically driven, the vast hydro-electric power sources of that section making electric power inexpensive. Boilers of 250-horse-power are used for heating and vulcanizing. The machinery is new and modern in every particular, and the company expects to develop a very large business under the management of the officers and superintendent, several of whom have had long practical experience in the tire business.

Annual Report of the United States Rubber Co.

THE annual report of President Samuel P. Colt, of the United States Rubber Co., which was sent to the stockholders early last month, is even better than the preliminary report furnished earlier, at the time of the \$60,000,000 bond financing.

The net sales of \$126,759,129 are \$1,759,000 larger than the preliminary estimates, and the balance of net profits for interest on funded debt of \$13,495,155 is practically \$1,000,000 better than the preliminary estimate of a balance of at least \$12,500,000.

As a matter of fact, net sales for 1916 gained \$33,898,113, or 36.5 per cent, over the previous year. The balance for interest (including floating debt) and dividends of \$14,743,774 was \$3,257,070, or 28 per cent, in excess of the corresponding figures for 1915.

It will be noted that while the sales and profits were both greater than in any previous year the percentage of profits to sales was less than in the previous year, and, therefore, the changes in prices inaugurated early this year were justified.

With the simplification of organization will come economies in administration, and the funding of indebtedness will further reduce actual running expenses. Already the company has begun the liquidation of subsidiary companies through absorption by the parent organization.

The increase in the tire business is worthy of special mention, being nearly 60 per cent larger than that of 1915.

Evidently the Sumatra plantations are proving a valuable asset of the company. The expert business shows a gain, but only a small one.

The reports of the president and the treasurer follow:

THE PRESIDENT'S REPORT.

To the Stockholders of the United States Rubber Co.:

The by-laws of the company provide that the president "shall make a report in writing to the stockholders at their annual meeting, reviewing the general business and condition of the company." In compliance therewith, your president submits the following report for the fiscal year ending December 31, 1916.

The treasurer's report, which is hereto appended and made part hereof, gives the consolidated general balance sheet as of December 31, 1916, and the consolidated income statement for the year ended December 31, 1916, of the United States Rubber Co. and all its subsidiary companies.

FUNDING OF COMPANY'S INDEBTEDNESS.

The most important event of the year has been the funding of the indebtedness of the company and its subsidiaries through the banking house of Messrs. Kuhn, Loeb & Co. Negotiations to this end were begun some months ago and but recently consummated. Through the sale of \$60,000,000 first and refunding mortgage 5 per cent bonds, the company is now provided with funds wherewith to pay its entire debt and the debts of its subsidiary companies, with the exception of \$9,000,000 General Rubber Co. debentures due December 1, 1918, and \$2,600,000 Canadian company bonds due October 1, 1946. In addition to the payment of the indebtedness, further working capital is also provided. The bonds of the Canadian company are not being retired at present through the refunding, inasmuch as they do not mature for nearly 30 years; and the debentures of the General Rubber Co. are also left undisturbed for the present, as the company has under consideration other plans for dealing with its important crude rubber interests. Provision, however, is made for the issue of additional bonds up to the amount of the capital stock of the company at any time outstanding (at the time of the authorization \$97,252,900) to take care of the above named bonded obligations, should it hereafter be found desirable to do so; and, under conservative restrictions, to provide also for the future growth of the company.

This funding has been carried out in a most thorough manner; and, while the bankers have been exacting in their requirements where the security of the bond was involved, they have at the same time shown a breadth and a spirit of fairness in the

whole transaction and a desire to have the company unhampered in the economic administration of its business, which cannot be too strongly commended.

To authorize the transaction, our stockholders responded to the call for proxies with a unanimity most gratifying to your directors and president, and which I wish to take this opportunity to acknowledge. More than three-quarters of each class of stock (the percentage of the whole being over 82 per cent) voted in favor of the transaction and no shares voted against it.

SIMPLIFYING OUR ORGANIZATION.

With the funding of our debt, we will be able to simplify our organization and thereby bring about economies in administration in several ways, among which will be the liquidation of companies whose separate organization is now unnecessary. Steps to this end will be promptly taken.

VOLUME OF BUSINESS.

The net sales of the company for the year 1916 were \$126,759,000, as against \$92,861,000 the previous year, an increase of \$33,898,000 or about 36 per cent.

PROFITS AND DIVIDENDS.

The net profits of the business for the year 1916, before deducting interest charges, amounted to \$14,743,000; after deducting interest charges the profits were \$11,226,000. These profits cover the dividends upon the preferred stocks, and enhance the intrinsic value of the common stock.

MAINTENANCE.

The custom of maintaining the fixed properties of the company in the highest state of efficiency and charging the cost of such maintenance to expense account has been again followed during the past year. Our plants are all in first-class, up-to-date condition and are now being run to full capacity.

BASIS OF INVENTORIES.

Following our usual practice, inventories of manufactured goods and materials have been taken at cost where cost was below market, and at market where market was below cost. Market to-day is generally above cost.

UNITED STATES RUBBER EXPORT CO., LIMITED.

Our export business, now consolidated under one organization, the United States Rubber Export Co., Limited, is being successfully pushed forward, although it is still relatively small, being only about 6½ per cent of our total business in 1916 as against 5 per cent in 1915.

UNITED STATES TIRE CO.

Our new "Royal Cord" tire and the new non-skid "Usco" tire have given us the most complete line of tires manufactured by any company. There is still a wide and increasing demand for the "Nobby Tread" and "Chain Tread," which are acknowledged to be the best non-skid tires in the market. Our tire sales for 1916 show an increase of 57.9 per cent over those of 1915.

OUR SUMATRA RUBBER PLANTATIONS.

The development of our rubber plantations in Sumatra has steadily continued during the past year. The amount of crude rubber received therefrom in 1916 was substantial and was largely in excess of previously estimated production. The future increase in production will be rapid, as the great number of young trees are more and more coming into bearing. Our most sanguine expectations from these estates are being realized and, it is believed that they will prove to be one of the most valuable assets of the company.

ADVANCE IN PRICES AND OUTLOOK.

While the profits of the company for 1916 were the largest in its history, the percentage of profits to sales was less than in the previous year, owing chiefly to the advance in materials and labor during the year. With the view of meeting these conditions an advance in prices of manufactured goods, varying from 10 to 20 per cent was made early this year.

The increase in net sales of the company for the first two months of the present year over the corresponding months of last year exceeds 20 per cent.

CONCLUSION.

It is now just a quarter of a century since the United States Rubber Co. commenced business. In that time it has steadily grown. In the last 15 years its business has increased five fold—thanks to the devotion of its working force.

It, therefore, gives me special pleasure to again refer to the continued fidelity and ability shown by the officers, heads of departments, those in charge of our Far Eastern plantations and the other employees of the company and its subsidiaries.

THE TREASURER'S REPORT.

UNITED STATES RUBBER COMPANY AND
SUBSIDIARY COMPANIES.

Consolidated General Balance Sheet, December 31, 1916.

ASSETS.

Property, plant and investments, including rubber plantations	\$130,187,628.57
Inventories, manufactured goods and material	\$48,530,397.55
Cash	10,123,709.23
Notes and loans receivable	1,763,999.72
Accounts receivable	26,052,707.43
Securities, including stock of United States Rubber Co. held by subsidiary companies	3,481,655.37
Sinking fund cash in hands of trustees	509,851.93
Miscellaneous	1,716,619.65
	92,178,940.88
Total Assets	\$222,366,569.45

LIABILITIES.

Capital stock, first preferred	\$60,773,600.00
Capital stock, second preferred	403,600.00
Capital stock, common	36,000,000.00
	\$97,177,200.00
Capital stock, Rubber Goods Manufacturing Co.	
Preferred issued	\$10,351,400.00
Owned by United States Rubber Co., deposited with trustees	9,402,800.00
	948,600.00
Common issued	\$16,941,700.00
Owned by United States Rubber Co., deposited with trustees	16,898,400.00
	43,300.00
Minority Canadian Consolidated Rubber Co., Limited, stock, preferred \$83,625; common \$101,455	385,080.00
Ten-year 6 per cent collateral trust sinking fund gold bonds, United States Rubber Co.	16,600,000.00
General Rubber Co. 5 per cent debentures	\$9,000,000.00
Ten-year 5 per cent debentures, Eureka Fire Hose Manufacturing Co.	970,000.00
Forty-year 6 per cent collateral trust gold bonds, Canadian Consolidated Rubber Co., Limited	2,600,000.00
Canadian Consolidated Rubber Co., Limited, 5 per cent debentures	2,500,000.00
Morgan & Wright 5 per cent debentures	5,600,000.00
Mechanical Rubber Co., and New York Belting and Packing Co., bonds	737,000.00
	20,807,000.00
Notes and loans payable	26,703,866.40
Accruals for importations of crude rubber	\$1,891,093.45
Merchandise accounts payable	6,526,168.24
Accrued interest, taxes, etc.	801,526.80
	9,218,788.49
Reserved for dividends	1,223,040.00
Insurance reserve fund	\$932,288.05
Employee's accident fund	368,041.09
	1,300,329.14
Reserve for depreciation	5,000,000.00
Fixed surpluses (subsidiary companies)	15,080,230.78
Surplus	28,479,134.64
Total Liabilities	\$222,366,569.45

Respectfully submitted,

W. G. PARSONS, Treasurer.

ANNUAL ELECTION.

BOARD OF DIRECTORS FOR 1917.

The annual meeting of the stockholders of the company was held at New Brunswick, New Jersey, March 20, and the following directors were elected:

James S. Alexander, New York City.
Walter S. Ballou, Providence, Rhode Island.
James C. Brady, New York City.
Nicholas F. Brady, New York City.
Middleton S. Burrill, New York City.
Samuel P. Colt, Providence, Rhode Island.
Harry E. Converse, Boston, Massachusetts.
Edgar B. Davis, Brockton, Massachusetts.
James Deshler, New Brunswick, New Jersey.
James B. Ford, New York City.
Francis L. Hine, New York City.
Henry L. Hotchkiss, New Haven, Connecticut.
William S. Kies, New York City.
Lester Leland, Boston, Mass.
Samuel M. Nicholson, Providence, Rhode Island.
Raymond B. Price, New York City.
Homer E. Sawyer, New York City.
Charles B. Seger, New York City.
William H. Truesdale, Greenwich, Connecticut.

Theodore N. Vail, Boston, Massachusetts.
Elisha S. Williams, New York City.

This list consists of the old board with three additions, namely, James S. Alexander, president of the National Bank of Commerce, New York City; William S. Kies, vice-president of the American International Corporation, New York City; and Charles B. Seger, vice-president and comptroller of the Union Pacific system, New York City. These gentlemen are practically those interested in the Kuhn-Loeb banking group which has purchased the recent new \$60,000,000 bond issue. These three men bring a new element into the board of directors and will emphasize the undoubtedly valuable banking connection which the corporation has recently effected.

ELECTION OF OFFICERS.

The board of directors of the United States Rubber Co., elected at the annual meeting of stockholders, met at the office of the company, 1790 Broadway, New York City, March 22, and organized by the election of the following officers for the ensuing year:

Samuel P. Colt, president; James B. Ford and Lester Leland, vice-presidents; Raymond B. Price, vice-president in charge of development department; Homer E. Sawyer, vice-president in charge of footwear department; Elisha S. Williams, vice-president in charge of mechanical departments; Samuel Norris, secretary; John D. Carberry, assistant secretary; W. G. Parsons, treasurer; E. J. Hathorne, assistant treasurer.

PRESIDENT COLT ENTERTAINS.

On Wednesday evening, March 21, Colonel Samuel P. Colt, president of the United States Rubber Co., tendered a dinner at the Metropolitan Club, New York City, to the directors and operating staff of the company and several New York bankers and personal friends, the main object being to introduce to the heads of departments and operating staff the three newly elected directors, Messrs. Alexander, Kies and Seger.

The dining room was handsomely decorated, and a novelty was that all these decorations were of rubber in its various forms and colors, and the boutonnières, which were artificial flowers in natural colors, were also made of rubber. There were about 60 guests. Speeches were made by Otto H. Kahn, Homer E. Sawyer, William S. Kies, Senator Le Baron B. Colt, Edgar B. Davis, Francis Lynde Stetson, Mortimer L. Schiff, Victor E. Mitchell, K. C., and Dr. Ernest M. Stires. The menus were decorated with photographs of the company's plantations in Sumatra, each menu having a different picture. During the banquet Nahan Franko's orchestra furnished a very artistic musical program.

DIRECTORS OF LUMBER COMPANIES TO INSPECT PROPERTIES.

A party consisting of directors and guests of the Atlantic Coast Lumber Corporation and United Timber Corporation, including Colonel Samuel P. Colt, United States Senator Le Baron B. Colt, of Rhode Island; James B. Ford, John D. Carberry, W. G. Parsons, J. N. Gunn, J. Cunliffe Bullock, Walter S. Ballou, Nathaniel Myers, Charles A. Emerson, Henry L. Hotchkiss and H. E. Robinson, left New York City March 23 for Georgetown, South Carolina, on a five-day tour of inspection of the various properties in South Carolina in which they are interested.

RUTHERFORD RUBBER CO. CHANGES.

Recent changes in the Rutherford Rubber Co., Rutherford, New Jersey, forces include the appointment of J. J. White, former manager of the New Haven, Connecticut, branch, as manager of the branch at Cleveland, Ohio; Charles Schoneman, former manager, first of the Hackensack, New Jersey, and then of the Baltimore, Maryland, branch, as division manager; C. A. Reynolds, in charge of all New England branches, and James O'Hea, manager of the new Pittsburgh, Pennsylvania, branch.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

AKRON is having a struggle to keep pace with its own growth. Last year our 27 rubber companies manufactured rubber products valued at \$188,000,000, the tire output being 40,000 tires daily. It is reported that not less than 6,500 additional employees are required by the four largest companies alone, to enable the planned expansion in the tire industry to be carried out. An estimate of the present number employed in the Goodrich, Firestone and Goodyear plants is given as about 46,000.

In presenting the annual report of The B. F. Goodrich Co. and subsidiary companies to the stockholders, Bertram G. Work, president of the company, summed up the past year's transactions as follows:

After making full provision for all maintenance charges, depreciation, bad and doubtful debts, and other items which it was deemed wise to take out of the year's earnings, the net profits for the period amounted to \$9,568,764.87 as compared with \$12,265,679.79 for 1915.

The net sales for the year 1916 amounted to \$70,990,781.66 as compared with \$55,416,866.55 for 1915, representing a gain of 28 per cent. This gain was due to increases in all departments of the business.

The decrease in net earnings was largely due to the fact that advances in selling prices did not keep pace with rapidly increasing costs. Not only materials and labor, but also practically all expenses incident to the conduct of the business were upon a higher scale of costs than during the previous year.

The directors have voted, subject to the approval of the stockholders, to retire 9,000 shares of the preferred stock. This is in accordance with the provision of the company's charter which provides for the retirement of a minimum of 9,000 shares of the preferred stock each year, beginning with July, 1914. After this year's retirement there will remain outstanding \$26,400,000 of preferred stock.

The increase in bills payable shown on the balance sheet, is due to a large increase in inventories which was made necessary on account of increased volume of business, congested condition of markets and delays in transportation.

The company has added to its plant account during the year 1916, extensions and equipment costing \$3,519,549.93. Beyond completing the work under construction, no further important plant extensions are planned at present.

From the surplus at December 31, 1916, the directors voted to set aside \$700,000 for the redemption of preferred stock together with \$121,465.50, representing the reduction of preferred stock purchased, from cost to par, and a further amount of \$100,000 appropriated for addition to the pension fund.

The detailed report follows:

CONSOLIDATED BALANCE SHEET.

December 31, 1916.

ASSETS.	
Capital Assets—	
Real estate, buildings, plant, machinery and sundry equipment less reserve for depreciation of \$2,521,168.95.....	\$16,225,846.27
Patents	376,036.38
Goodwill	57,798,000.00
Investments in other companies, etc.....	1,192,124.26
Société Française B. F. Goodrich—representing the net investment at December 31, 1916	3,183,742.92
9,037 shares of 7 per cent cumulative preferred stock in treasury, at par.....	965,700.00
Current Assets—	
Inventory of raw materials, partly manufactured and finished stock.....	\$26,247,006.66
Trade accounts receivable, after deducting reserve to cover doubtful accounts, discounts and allowances.....	7,131,025.29
Other accounts receivable.....	426,779.52
Bills receivable	208,466.77
Cash in banks and on hand.....	1,514,241.63
Deferred charges to future operations—	
Prepaid insurance, interest, taxes, etc.....	427,970.26
	\$115,636,879.96

LIABILITIES.	
Capital Stock—	
600,000 shares of common stock of the par value of \$100 each	\$60,000,000.00
200,000 shares of 7 per cent cumulative preferred stock of the par value of \$100 each	\$30,000,000.00
Deduct:	
27,000 shares of preferred stock redeemed and cancelled	2,700,000.00
	27,300,000.00
	\$87,300,000.00
(The preferred stock is redeemable in case of dissolution, liquidation, merger or consolidation at \$125 per share.)	
Current Liabilities—	
Accounts payable	\$1,297,387.85
Sundry accrued liabilities.....	716,088.32
Bills payable	6,503,515.00
	8,516,991.17
Reserves for—	
Contingencies	\$2,000,000.00
Pensions	200,000.00
	2,200,000.00
Appropriation from surplus for redemption of preferred stock as above.....	
	2,700,000.00
Surplus (per annexed account).....	
	14,919,888.79
	\$115,636,879.96
SURPLUS ACCOUNT.	
December 31, 1916.	
Balance, January 1, 1916.....	\$10,583,589.42
Net profit for the year ending December 31, 1916, per annexed account.....	9,568,764.87
	\$20,152,354.29
Deduct:	
7,000 shares of 7 per cent cumulative preferred stock at par redeemed and cancelled during year.....	\$700,000.00
Additional appropriation for pension fund.....	100,000.00
Reduction of treasury stock, purchased, from cost to par.....	121,465.50
7 per cent dividend on preferred stock for the year ending December 31, 1916.....	1,911,000.00
4 per cent dividend on common stock.....	2,400,000.00
	5,232,465.50

	\$14,919,888.79
PROFIT AND LOSS ACCOUNT.	
For the Year Ending December 31, 1916.	
Net sales	\$70,990,781.66
Deduct—manufacturing, selling and general administration expenses	60,611,332.55
	\$10,379,449.11
Profit from operations.....	235,461.37
Add—Miscellaneous income	\$10,614,910.48
	\$11,850,371.85
Deduct:	
Provision for depreciation.....	\$890,163.62
Interest on bills payable, etc.....	155,981.99
	1,046,145.61
Net profit carried to surplus account....	\$9,568,764.87

At the regular annual meeting of the stockholders held on March 14, at the office of the Goodrich company, 1780 Broadway, New York City, directors were reelected as follows: D. M. Goodrich, F. A. Hardy, C. B. Raymond, H. E. Raymond, E. C. Shaw, and H. E. Joy.

In accordance with a resolution of the directors at their last meeting, the stockholders ratified the reduction of the capital stock of the company by the retirement and cancellation of 9,000 shares of the preferred stock mentioned above.

At a meeting of the directors held immediately after the meetings of the stockholders, the following executive officers were elected: B. G. Work, president; A. H. Marks, vice-president; H. E. Raymond, vice-president; E. C. Shaw, vice-president; C. B. Raymond, second vice-president; W. A. Means, second vice-president; Guy E. Norwood, secretary and assistant treasurer; L. D. Brown, treasurer, and J. C. Lawrence, assistant treasurer.

The following were appointed as an executive committee: B. G. Work, A. H. Marks, H. E. Raymond, E. C. Shaw, C. B. Raymond, W. R. Means and A. B. Jones. L. D. Brown and F. C. Van Cleef were added to the operating committee.

In an address recently delivered before the Cleveland Engineering Society, Dr. W. C. Geer, director of processes of the Goodrich Company, predicted that within two years rubber would replace leather to a large extent in shoe manufacture.

Only 16 years ago the Firestone Tire & Rubber Co. was established for the manufacture of carriage tires on a small scale, and

now this company has become one of the largest manufacturers of all types and kinds of pneumatic and solid rubber tires, tire accessories and rims. From a plant covering less than an acre, the Firestone factories have grown until the floor space is more than 40 acres, with promise of continued expansion during the present year. The consolidated balance sheet of the last fiscal year, dated October 31, 1916, follows:

ASSETS.	
Land, buildings, machinery and equipment.....	\$10,687,963.35
Sound value as appraised by American Appraisal Co. as of September 30, 1916, plus expenditures in October, 1916, for additions to property.....	647,922.50
Investments in securities.....	9,715,949.80
Finished and in-process goods, materials and supplies.....	Inventoried at cost.....
Subscribers to preferred, 6 per cent., cumulative capital stock (\$4,000,000.00 realized in cash on November 6, 1916, and the remainder subsequently realized.).....	3,008,775.22
Cash.....	325,490.30
Notes and accounts receivable—trade debtors.....	6,829,632.13
Due from employees.....	1,107,083.11
Account of capital stock purchases and sundry advances.....	38,032.15
Expenditures applicable to future operations.....	\$34,360,848.56
LIABILITIES.	
Preferred, 6 per cent., cumulative capital stock subscriptions..	\$5,000,000.00
Par value.....	3,000,000.00
Common capital stock.....	5,245,843.76
Notes payable.....	1,271,305.38
Borrowed money.....	386,851.96
Accounts payable to trade creditors.....	1,000,000.00
Accounts payable, miscellaneous.....	150,417.98
Sundry creditors, accrued salaries, wages, taxes, interest, etc.....	18,306,429.48
Welfare and pension reserve.....	\$34,360,848.56
Insurance reserve.....	
Surplus.....	

The stock distribution plan of the Firestone Tire & Rubber Co., previously mentioned, has received remarkable support, 90 per cent of the total force, or over 11,000 Firestone employees, taking advantage of the company's offer to make them shareholders. Rarely, if ever, have employees had the same occasion for feeling their responsibility in so large a business because of their own personal interest and the future interest of their families. They have acquired stock which at time of purchase is quoted at nearly half again what they will pay for it. They have this stock in a company capitalized at \$15,000,000, the certified assets of which run over \$34,000,000, the surplus already listed being \$18,000,000. All of which means that they will profit not only through their work in the future and the company's further growth, but that they profit through their good work in the past.

While the step taken by this important company is of no small significance to the business world in general, it is only the latest achievement in a long program of cooperative measures which form a part of the broad-minded and far-sighted plans of the president, H. S. Firestone, including the \$350,000 Firestone Club House opened last year; also "Firestone" Park, with its beautifully situated home building plat; the establishment of the Rubber City Savings Bank near the Firestone factories, and the setting aside of a \$1,000,000 fund for benefits to employees, such as insurance, pensions and the like.

East Akron, the home of the American Hard Rubber Co.'s factory and that of the Mohawk Rubber Co., the General Tire & Rubber Co. and the Goodyear Tire & Rubber Co. is several miles from the banking center of the city. In order to encourage habits of saving among the factory employees and as a convenience to the manufacturers in this section, The Ohio Savings & Trust Co. has been formed, with officers as follows: President, F. A. Seiberling, president of the Goodyear Tire & Rubber Co.; vice-president, C. W. McLaughlin, vice-president of the Mohawk Rubber Co.; treasurer, W. E. Palmer, assistant treasurer of the Goodyear company; secretary, C. F. Ayers.

In order to secure cash to take care of increased business,

the Goodyear Tire & Rubber Co. will issue a total of \$9,370,000 in stock, of which \$6,000,000 will be preferred and \$3,370,000 common. The preferred stock has been disposed of to bankers, and the common will be offered to stockholders in the ratio of 20 per cent of their holdings. The company is capitalized at \$50,000,000, half preferred and half common, of which only \$17,500,000 of each has been issued. The new financing will bring the total issues to \$23,500,000 preferred and \$20,870,000 common.

At the last annual meeting of the stockholders of the Miller Rubber Co., Akron, Ohio, the officers of the company were authorized to turn over to the United States Government the benefit of its organization and equipment in any needed capacity, and hearty cooperation and support were pledged in any emergency that may arise.

The Amazon Rubber Co. is offering to the public, at par, \$100 per share, a new issue of stock consisting of \$400,000 of common and \$100,000 of 7 per cent preferred. This company is rapidly securing national distribution for its product—a standard tire with extra breaker strips on the sides and an extra heavy brown tube.

F. C. Burt, an Akron tire man, has recently joined the sales force of the Amazon company.

D. A. Murray is now connected with the sales department of The American Rubber & Tire Co. as district agent, with supervision of sales in the Central district.

Fred Kemple, formerly manager of the pneumatic tire department of the above company, has been promoted to the position of factory superintendent.

Harry E. Boyd, assistant superintendent of The Adamson Machine Co., died on March 12 of pneumonia, after a few days' illness. Mr. Boyd had been connected with the Adamson company for five years and was considered one of its most capable and promising men. His loss is deeply regretted by the firm as well as by his personal friends.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

THE automobile show in Boston, last month, was in many respects the best attended and most productive of business of any ever held here. Not only were more automobiles sold, but these sales individually averaged higher prices than those of former years. This, in itself, is an indication of the general prosperity of New England and its leading city.

Not only in pleasure cars but in those intended solely for transporting goods, the demand was unprecedented. To-day there are a hundred business houses interested in motor trucks where there was one five years ago. Much of the suburban haulage of heavy as well as light merchandise is by these vehicles, while there is a steadily increasing amount of stock and manufactured goods being transported over the road, which formerly was carried by freight over the railroads. Every year this motor-truck business is extending further and further in point of distance, and naturally has had its effect in bringing business to the motor-truck exhibitors at this auto show.

Over 500 cars and trucks were shown, together with 170 accessory exhibits. The Mechanics Building did not provide enough space, although the basement, Grand Hall, and its gallery, the Exhibition Hall (two floors) and Paul Revere Hall were brought into requisition, and so Horticultural Hall, four blocks west, and the ballroom of the Copley-Plaza Hotel, two blocks north, were used for the overflow. The rubber trade was only meagerly represented, and, as in previous years, there were but

few tire exhibits. Perhaps the best of these was that of the United States Rubber Co., of New York City.

* * *

The B. F. Goodrich Co. chose auto-show week to place in its big Boylston street window two of its Silvertown cord tire machines, perhaps as intricate and ingenious pieces of mechanism as any used in the tire industry. As a consequence, the sidewalk in front was one of the most crowded areas of its size in the city, and many of the spectators, of a more mechanical turn of mind, invaded the window itself for a closer inspection of the working of these \$20,000 machines, which lay the flattened cords smoothly and evenly over the surface of the carcass, these to be imbedded with rubber and vulcanized. Expert mechanics from Akron were in charge of these automatic machines, which place two layers of cord about the tire in such manner that every inch of cord is under uniform tension. Although the double operation takes about 20 minutes, there were many spectators who watched the entire operation from beginning to end.

* * *

The writer wishes to rectify an error which appeared in the March letter relative to the Plymouth Rubber Co. factory. It was spoken of as being located in Stoughton, Massachusetts, instead of Canton, this state, the concern having removed from Stoughton six years ago. Because, for years before, the writer had always connected this company's name with the town of Stoughton, the error inadvertently slipped in. The new factory building, recently completed, puts Canton the more prominently on the map, and locates it definitely in the minds of all passengers between Boston and New York by way of Providence.

* * *

The Revere Rubber Co. plant of the United States Rubber Co., at Chelsea, has decided to discontinue its electric plant and will rely for lighting and motive power on the Edison company's service, a long-term contract for such service having been entered into within the last month. It is estimated that this will amount to about 5,000 horse power. The steam service, of course, will be continued for heating and vulcanizing purposes. The company's heel and sole business, which is only a portion of its output, is growing by leaps and bounds, and its specialties in several other lines are in heavy demand at present.

* * *

Mr. and Mrs. Franklin W. Pitcher celebrated the fiftieth anniversary of their marriage at their home in Easthampton, Massachusetts, on Tuesday, March 13. More than 200 guests attended, among them many intimate friends connected with the rubber and textile industries.

Mr. Pitcher, who is treasurer and general manager of the Easthampton Rubber Thread Co., became interested in the elastic fabric business many years ago, and this led him to join in the organizing of the Revere Rubber Co., Chelsea, Massachusetts. He was the first treasurer of that company and afterwards its president. In 1885 he moved to Easthampton to be in close touch with the Easthampton Rubber Thread Co., and with the exception of a few years has ever since resided there, where he has become identified with several of the financial and manufacturing interests of that town. Both Mr. and Mrs. Pitcher are natives of Maine and were married at Pittston, that state, March 13, 1867. They have two sons and a daughter. One son, William L. Pitcher, is superintendent of the Easthampton Rubber Thread Co.'s factory, and the other, Walter F. Pitcher, is treasurer and general manager of the Franklin Steel Works.

* * *

The Boston Woven Hose & Rubber Co. did a very prosperous business last year, its sales exceeding \$6,000,000, and it is expected that for the present year it will reach the \$7,000,000 mark in output. Last year its net earnings are reported to have been

nearly 40 per cent on its \$2,000,000 common stock after paying the preferred dividends. The sum of \$322,710 was spent out of earnings on new buildings and equipment and \$750,000 transferred from the surplus to capital account. Extra cash dividends have been paid in 1912, 1914 and 1915, to a total of 110 per cent, besides the annual dividends, and the rights to purchase the new issue of \$1,000,000 common stock are held at a substantial premium.

* * *

President George B. Dryden and Vice-President George C. Reeves, of the Dryden Rubber Co., Chicago, Illinois, were in Boston several days the middle of the month, making their headquarters at the Boston office, which is in charge of J. A. Ford. This company, which makes a large variety of molded goods, is finding a heavy increase in the demand for its fiber soles and rubber heels, which are being used extensively by shoe manufacturers.

* * *

The award of contracts for 16 dirigibles by the United States Government will doubtless result in at least a share of the business coming indirectly to the American Rubber Co. factory of the United States Rubber Co. at Cambridge. This factory has made a special study of balloon fabrics, its line of this material having been used for the United States Navy balloons ordered of the Connecticut Aircraft Co., one of the concerns which has secured a share of the new contract.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE demand for rubber goods of every description continues on the same record breaking plane that has characterized the industry for more than two years, and it is uncertain when there will be any appreciable diminution. While the European War with its enormous demands, unquestionably has a most substantial effect on the unprecedented activity of the rubber factories, there is no denial of the fact that the normal demand for ordinary production is increasing at a rate seldom, if ever, equaled in any other industry. This is especially true as regards the manufacture of automobile tires and other accessories.

All the factories in Rhode Island are still being driven to capacity, notwithstanding which the accession of orders exceeds the output and has done so for months. From every plant comes a similar complaint that more operatives could be utilized to good advantage, but that it is impossible to obtain additional help. The scarcity of help is all that deters, in several instances, the extension of plants by the erection of new buildings or the construction of material additions to the present buildings.

* * *

Deeds and mortgages involving all the rubber manufacturing plants in Rhode Island that are subsidiaries of the United States Rubber Co., were placed on file in this city, Woonsocket and Bristol, on March 7, transferring to the parent corporation all the holdings in this State and elsewhere. The mortgage, which covered over 230 typewritten pages and is for \$97,252,900, covers not only the properties in Rhode Island, but in six other States—New York, New Jersey, Massachusetts, Connecticut, Indiana and Michigan—and is given to the Central Trust Co. of New York, to secure the principal and interest on the recent issue.

The Rubber Goods Manufacturing Co., a corporation controlled by the United States Rubber Co., also placed on record a mortgage to the Central Trust Co. of New York, as trustees, covering properties in several States, to secure gold bonds aggregating \$27,293,100.

Previous to the filing of the mortgages here and elsewhere, deeds were placed on record conveying all the property in Providence, Woonsocket and Bristol, as well as in Millville. As a

part of the general plan, deeds were also filed conveying to the United States Rubber Co. the plants of the Revere Rubber Co., the Joseph Banigan Rubber Co., the Woonsocket Rubber Co., the National India Rubber Co., the Lawrence Felting Co., all subsidiaries of the parent company, and the plant of the Mechanical Fabric Co. was conveyed to the Rubber Goods Manufacturing Co.

A new motor ambulance has been purchased by a committee of overseers and others at the factory of the National India Rubber Co., at Bristol, as a memorial to the late Le Baron C. Colt, former vice-president and manager of that corporation and a nephew of Col. Samuel P. Colt, president of the United States Rubber Co.

The ambulance is to be used in conveying the sick and injured to hospitals or to their homes. It will be housed at the garage of the factory of the National Co., on Wood street, and will be free of charge to all who desire its services. It was purchased from a fund raised by the foremen, office help and others at the National Rubber Co., and by relatives and friends of the late Mr. Colt, outside of the factory.

The late Robert J. Bowes, of Millville, Massachusetts, for many years manager of the Lawrence Felting Co., and son of the late William J. Bowes, who founded the concern, left an estate of \$108,019.25 in personal property and \$5,450 in real estate.

Some of the departments of the Lawrence Felting Co.'s plant, at Millville, were unable to operate for several days the early part of the past month owing to the high water in the Blackstone river, which was caused by the bursting of a dam at Uxbridge. The river, on March 1, reached a point more than 20 inches above its ordinary level.

The Fisk Rubber Co., of New York, has given up its branch store at 17 Dorrance street and concentrated its local business at 134 Fountain street, Providence.

The Central Automobile Tire Co., of 111-119 Stanford street, Boston, has opened a branch at 15-17 Dorrance street, Providence.

H. T. Mason, of Boston, manager of the sole and heel department for New England of the Goodyear Tire & Rubber Co., was the principal speaker at the annual meeting of the Rhode Island Shoe Retailers Association on March 6. He spoke at considerable length in a description of "Neolin" soles.

The Anchor Webbing Co. has had plans drawn for a one-story office building, 50 by 60 feet, and a one-story and basement weave shed, 40 by 120 feet, in addition to its plant on Brook street, Pawtucket. The company has recently increased its capital stock from \$60,000 to \$150,000, according to its statement filed at the office of the Secretary of State.

By an act of the Rhode Island General Assembly, the corporate name of the Phillips Insulated Wire Co. has been changed to Phillips Wire Co., without any change in capitalization.

Terrence McCarthy, president of the Narragansett Rubber Co., Bristol, was removed to St. Joseph's Hospital, Providence, on March 13, to undergo medical treatment. He has been ill since about the first of last December and after a series of X-Ray pictures had been taken it was decided to remove him to the hospital. He is reported as improving.

I. Victor Stone, chief chemist of the Revere Rubber Co.'s plant, Valley street, Providence, gave an interesting address on the manufacture of rubber, illustrated by stereopticon views, before the Brotherhood of the Elmwood Christian Church recently.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

THE death of Ferdinand W. Roebing, Sr., secretary-treasurer and general manager of the great wire mills of the John A. Roebing's Sons Co., occurred March 16. Business throughout Trenton was practically at a standstill while the funeral services were being conducted.

John A. Lambert, treasurer and general manager of the Acme Rubber Co., gave an interesting talk on the subject of rubber to the members of the Trenton Rotary Club at a recent meeting of the organization.

Joseph B. Linerd has been made a member of the board of directors and appointed general manager of the Globe Rubber Tire Manufacturing Co., Trenton, New Jersey, with an executive office at 1853 Broadway, New York City.



J. B. LINERD.

Mr. Linerd is a man of ripe experience in the tire industry. After four years with the Goodyear Tire & Rubber Co., Akron, Ohio, he became associated with the Ajax Rubber Co., Inc., New York City, of which company he was shortly afterwards appointed sales manager.

It is stated that the appointment of Mr. Linerd is the first step in an intensive, nation-wide sales campaign which will be conducted from the new executive office at the above mentioned location. The Globe company has been manufacturing hand-made automobile tires for four years, and last year it was found necessary to double its capacity. These increased facilities give it a capacity of 1,000 tires per day, with a present demand sufficient to market this output.

The private mark of an automobile tire dealer in this city enabled the police of Bridgeport, Connecticut, to trace the owner of an automobile which had been stolen here. The car was found abandoned in Bridgeport, with every mark which might lead to identification apparently removed. The police in their efforts to trace ownership took off the tires and discovered a marking by which a Trenton tire dealer was able to tell to whom he had sold the tires.

The Court of Errors has rendered an opinion upholding a decree of Chancellor Backes in which he ruled that Isaac Fineberg must pay to Harry Freedman the sum of \$12,197 in settling up a partnership in a rubber reclaiming business in which they were engaged in this city.

The Crescent Insulated Wire & Cable Co. has filed with the Secretary of State, a certificate increasing its capital stock from \$250,000 to \$1,000,000. General C. Edward Murray is president.

RUBBER ASSOCIATION OF AMERICA MEETINGS.

At the meeting of the Arbitration Committee held in the Association rooms, March 15, W. F. Bass and M. L. Cramer were elected to serve for one year; Horace De Lissier and A. H. Brown, two years; W. E. Bruyn and R. B. Woodbury, three years, and W. G. Ryckman, chairman, three years.

The Executive Committee of the Rubber Reclaimers' Division met on March 29 and prepared a circular on "Standards of Rubber Scrap Specifications and Packing," to be submitted to the meeting of the entire division on April 11.

The Rubber Sundries Manufacturers' Division met March 30 to decide on the "Open Price Exchange" matter.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

DURING last November a prominent waterproofer told me he could book orders for 100,000 waterproof garments, but that it would be utterly impossible to turn out the goods as the whole capacity of his factory was required for government work. Since that time we have had an almost uninterrupted spell of wintry weather, our coldest time for 35 years. It is not surprising, therefore, that the home demand for waterproof goods has slackened off considerably. On one or two occasions there has been a run on goloshes, which are by no means superabundant, and it is noticeable that two or three firms are now repairing old and leaky ones, a thing one was told a few years ago could not be done. It is remarkable how the official pronouncement to save money by wearing your old things has been carried into practice, all sorts of commodities being either utilized in their worn state or made presentable by some process of renovation. Mention may be made of the use of old bicycle tires by the cobbler for patching boots. This mention of tires leads me to remark that the decrease in the output of tires for private motor cars, owing to the available hands being wanted for government work, has now been followed by severe restrictions on private motoring, so that the lack of tires will hardly be felt.

RUBBER BUSINESS SLACK.

Although raw rubber remains at about pre-war prices in contradistinction to most other commodities, the immediate future at the time of writing is full of uncertainty, owing to prospective developments in the international situation. As regards the rubber business generally, there is a decided slackness, owing to many large government orders having been worked off and home demand for private consumers being decidedly small. The high price of cotton has proved a setback to the staple Lancashire industry, which is in a very unsettled state. It is announced that the imports of many classes of goods, especially of the luxury type, are to be strictly curtailed. Whether American rubber sponges sold at 6d. each, and Japanese air-cushions at 1s. 6d., will be considered as luxuries I do not know, but it is certain that their classification as such would not be objected to by home manufacturers, who have watched their advent and sustained popularity with some concern.

EMBARGO LIST ADDITIONS.

The extension of the embargo list of May 10, 1916, affects among other exports those of goods made wholly or partly of rubber, gutta percha or balata, which can now be exported only to British possessions and protectorates, all other destinations being prohibited. This, of course, takes them out of a previous class, where they were prohibited being exported to any and all destinations.

ACCELERATORS.

Before the Manchester Section of the Society of Chemical Industry on February 2, S. J. Peachy, of the local school of technology, read a paper on this subject, dealing mainly with para-nitrosodimethyl aniline, patented by the author, and now on the market under the name of accelerine. The facts presented regarding accelerine were much the same as in the review of the organic accelerators in the January 1, 1917, issue of *THE INDIA RUBBER WORLD*. It was emphasized that the accelerating effect of aniline is extremely small, though methyl aniline is decidedly better. In order to produce a non-blooming rubber with accelerine there can be no saving of time, the ordinary length of cure, as with sulphur alone being necessary. Accelerine is sold in bulk with 30 per cent of

water, which must be removed before use. The substance shows a tendency to cake on the back roll of the mixer, and it is desirable to mix 20 per cent of Kisselgahr with it to overcome this.

An interesting discussion followed the reading of the paper. In reply to some remarks by Mr. Terry, the author said that he had experimented only with low-grade reclaimed rubber and that, therefore, the statement that accelerine was of no use with reclaimed rubber might have to be modified in the case of high-class alkali reclaims. With regard to detection of accelerine it was usually noticed that the acetone extract had a dark color. Mr. Smith, as one who had used a good deal of accelerine, commented on the fact that all the samples shown were in sheet form press-cured, and suggested that difficulties had arisen from blowing in the case of solid rubber, steam-cured. On this matter, and also as to whether accelerine was useful in eliminating the effect of the variability in plantation rubbers, the author said that the present extent of his experience did not allow him to express a decided opinion. It was agreed that accelerine had a decided though faint darkening effect on rubber and that its use was not desirable in the case of very white rubbers.

BAYER ACCELERATORS TO BE MADE IN ENGLAND.

An interesting matter in connection with the use of accelerators came before the patent authorities a little time ago. This was an application by the North British Rubber Co., Limited, to manufacture for its own use accelerators patented in this country by the Bayer Co. This application was opposed by Alfred Smith & Co., a Manchester firm of rubber chemical manufacturers, which had obtained the sole agency for the manufacture and sale under royalty. At a later date an application was made by the Hookey Hill Rubber & Chemical Co., located a few miles from Manchester, for a license to manufacture for its own use and to sell to others the piperidine accelerators patented by the Bayer Co. These licenses have been granted. It is noticeable that though either time or sulphur may be saved by the use of accelerators in practice the saving in time is always aimed at, despite the phenomenal rise in the price of sulphur in the last two years. Of course, it may yet turn out that the rapidity of vulcanization is not altogether to the benefit of the rubber goods as regards lasting capacity.

BUSINESS PRINCIPALS REQUIRED TO REGISTER.

The Registration of Business Names Bill having now come into operation it is imperative for the A B C and X Y Z Rubber companies which may be doing a retail business in towns to register the names of their principals. Although the act is essentially a piece of war legislation aimed at alien traders it may be remembered that the idea is by no means new, as previous bills have been brought before Parliament by private members to achieve the same object. These bills, however, failed to pass into law, owing to non-alien obstruction.

THE LABOR PROBLEM AFTER THE WAR.

The period of demobilization is seen to be one in which troubles, if not actually chaos, may well be expected if the matter is not taken in hand by experts removed from officialdom. It is interesting, therefore, to note that a strong executive committee has been formed by the Federation of Employers and Employees to tackle the problem of the reabsorption into industry of labor released from military duties. On this committee the name of James Tinto, head of the Irwell & Eastern Rubber Co., Limited, appears as representative of

the rubber trade. I may mention that H. L. Rothband, of Mandelberg & Co., Manchester, has issued a book explaining his scheme for promoting the employment of disabled soldiers and sailors. An objection to what is at present being done by the labor exchanges is that the latter ask the manufacturers what wages they are prepared to pay a man before they have had an opportunity, by interview, of forming an estimate of the man's probable worth.

TRADE NOTES.

The establishment of the Pirelli General Cable Works, Limited, at Southampton, has been in operation two years. It is probably the most modern in equipment of all such works. Situated on a private pier, with a great electrical crane and with monorail system, its materials and its finished product can be quickly received, moved to any portion of the plant or shipped with facility. Only a third of the available area is covered with two-story buildings. All the machinery is propelled by electricity, secured from the city mains. A boiler house supplies steam for rubber working, cable heating and drying, and the lead furnaces are heated by gas produced on the grounds. Both rubber and paper insulated wire are manufactured, as well as tape and insulating material.

This corporation is a joint enterprise of two world-known concerns, the General Electric Co., Limited, one of the largest firms of electrical manufacturers in Great Britain, and Pirelli & Co., of Milan and Spezia, Italy, the largest producers of rubber goods and cables in Italy. Its work is largely on government orders.

The Parent Tyre Co. has virtually all its capital of over £2,000,000 invested in the Dunlop Rubber Co., and it has an agreement for a royalty of 6 per cent on the Dunlop net profits. This year the royalty amounts to £24,000, compared with £23,410 a year ago. The maximum dividends of 5 per cent and 8 per cent have been paid on the preferred and common shares, the deferred shares getting 7 per cent.

In a recent High Court trial, judgment was given for the Alpertons Rubber Co. in an action to prevent Mr. Manning, its late manager, from utilizing his formula book for the benefit of the Beldan Tyre Co., by whom he is now employed. There were special circumstances in this case, and I am not criticizing the judgment. The defendant's counsel, however, asked leave to appeal, saying that the decision affected works managers generally, as they had always considered that they had a right to utilize formulas acquired by them in the course of their employment. The leave to appeal was not granted, though there are many in the trade who would like to have heard the decision of the Appeal Court.

THE SITUATION IN RUSSIA.

By a Special Correspondent.

THE remarkable overthrow of the monarchy and probable establishment of a republic has opened Russian doors to America and promises to become a milestone in Russian-American trade relations. With one-sixth of the land area of the globe and a population of nearly 200,000,000, our country has long presented one of America's largest possible foreign markets, and one that has been growing rapidly with a rising civilization and quickening development. Although the circle of the Imperial family had other preferences, the Russian people, if they can maintain the new government, as now seems likely, will welcome American goods for immediate needs, and after the war, private capital for the development of vast natural resources.

There is every indication that no contracts or debts will be abrogated as a result of the revolution, as the government's finances are in excellent condition, and the policy of the people contemplates a more energetic prosecution of the war.

BANKING FACILITIES.

The banking machinery of Russia consists of The Imperial Bank, the Land Banks and the Government Savings Banks, all operated by the banking department of the government; the commercial or joint stock banks, which are private institutions; municipal banks, and mutual credit societies. The Imperial Bank is the largest bank in the world, its statement for October, 1916, showing total assets \$5,150,000,000 at the par value of the ruble*, and the total gold resources of \$1,854,000,000. It is the bank of issue for the entire empire, and although it may do a commercial banking business, its principal activities are with other banks, for which it receives deposits, makes loans and rediscounts bills. The Land Banks are of two classes, known as the Land Bank of the Nobility and the Land Bank of the Peasants, the latter having been created to facilitate the distribution of land to the peasant classes. The government operates a State Savings Bank with over 10,000 branches scattered through the Empire, which are the depositories of the savings of the people. On October 1, 1914, their total deposits amounted to about \$875,500,000 at the par value of the ruble, but these savings have increased greatly during the war. On August 14, 1916, they approximated \$1,648,000,000. While this is attributable in some measure to the abnormal prosperity incidental to the war, it is more directly attributable to the abolition of vodka, which has encouraged expenditures chiefly for better living facilities, clothing and food, and greatly increased average savings. The total increase in approximately two years, at the par value of the ruble, amounts to \$772,500,000, and at the present exchange value, about \$450,000,000.

Joint-stock banks, established in Russia in 1864, numbered 45 with 732 branches in 1913, with a total capital and surplus of \$381,615,000 and with deposits aggregating \$1,184,500,000 at the par value of the ruble. Not only do these banks exercise the usual functions of commercial banking, but they participate in the industrial activities of the country, financing, and in some cases owning outright, various industrial and commercial enterprises. Although not organized under a general banking law, each has a special government charter and operates under the supervision of the banking department of the government. This tremendous banking capital seems to be fully employed. For many years rates have averaged high, as is natural in a partially developed country. Bank failures involving a loss by depositors are practically unknown. The business is operated according to banking principles obtaining throughout the world. The commercial laws of the country are well established and adequately interpreted by the courts, so that apparently the banking operations of the country are as stable as those of any other nation.

MOVING THE "PROWODNIK" CO. TO MOSCOW.

The removal of the entire industry of the "Prowodnik" Co., the pioneer rubber manufacturing concern in Russia, from Riga to Moscow is worthy of more than a passing notice. Here was a practically unprecedented task. An industry with a capital of 50,000,000 rubles,* possessing a plant covering 3,000,000 square meters, machinery requiring 20,000 horse-power engines, and employing 18,000 persons being transferred bodily some 600 or 700 miles, rebuilt and reestablished in the short space of a few months, is a feat well worth recording.

This great industry was situated at Riga, on the gulf of the same name, an arm of the Baltic Sea. It was manufacturing many lines of rubber goods for trade and for the Russian Government. As a measure of precaution the factory was closed, but its importance to the government was such that the removal was advised from the coast to the heart of the nation.

It was a stupendous task, but with an energy worthy of the cause, it was accomplished by the aid of a force of engineers and workmen. Over 5,000 carloads of machinery and material were

*Ruble equals \$0.515.

transported, new buildings erected, and to-day over 7,000 employes are at work, turning out goods exclusively for the use of the government.

PRODUCTS AND VOLUME OF BUSINESS.

The principal products to-day are tires, solid and pneumatic, for motor cars, trucks, motorcycles, aeroplanes and army field ambulances. Besides these are manufactured pontoon bags, life preservers, protective masks (for use against asphyxiating gases), balloon fabric, carriage cloth, insulated wire, a variety of accoutrements for use in the army and navy, and hard rubber articles for electrical and medical use.

At the time of the closing down of the Riga establishment the output of pneumatic tires was 1,000 per day, but the principal business was the production of rubber footwear. In 1914 the daily production was nearly 100,000 pairs, and the total business of the company was upwards of 65,000,000 rubles. Its main outlet consisted of the 300 stores or branch establishments throughout Russia, though its export trade was widespread and steadily extending. Indeed, so important was this department of the business deemed by the Czar that he conferred on the director general of the works the honorary title of "Councillor of Manufactures," and later, because of services to the government, "Councillor of State."

WELFARE WORK.

In this connection it may be well to show how thoroughly this great corporation is following modern methods in welfare work. At the time of closing the works at Riga there were in operation, for the benefit of the employes and maintained by the company, schools, libraries, canteens, parks, hospitals with clinics, free medical aid, lying-in hospitals, nurseries, lecture halls, and a casino. The company built comfortable dwelling houses for its workers, established free savings banks, insured the lives of all workers after ten years' service and provided accident insurance and sick benefits. Not all these have yet been reestablished at the new works at Moscow, but plans are being completed for doing so as soon as the times will allow. Meanwhile, since the commencement of the war, this corporation has maintained a hospital at Petrograd, with 100 beds, for soldiers wounded in the defense of Russia.

Despite the heavy expenditures engendered by this removal, the company paid 10 per cent dividends in 1914 and 1915.

"TREUGOLNIK" PROSPERING.

The Russian-American India Rubber Co. "Treugolnik" is in receipt of numerous testimonials from the different ministries and departments of the government testifying to the satisfactory manner in which it is serving the cause in the interest of national defense. The plant at Petrograd is being worked to its utmost capacity, and almost exclusively on government work, supplying all kinds of rubber articles used by the different departments for war purposes.

It is reported that this company contemplates increasing its capital. Starting over 50 years ago with a capital of 500,000 rubles, this has been increased at various times. Only last year it was raised 9,000,000 rubles, and this latest report is that the contemplated increase will bring the capital stock up to 30,000,000 rubles, new shares being issued at the rate of 200 rubles for each 100 ruble (nominal) share. The company manufactures practically everything in rubber goods, and has been wonderfully profitable to its shareholders.

NEW RAINCOAT FACTORY IN AMSTERDAM.

Despite the scarcity of building supplies, raw materials and other difficulties incident to the war, a new establishment for the manufacture of waterproof clothing, to be known as the Hollandia Factories, has been erected by Kattenburg & Co., Amsterdam, Netherlands. The building is 262 by 58 feet, five stories high, and about 1,000 persons will be employed. Aside

from raincoats of rubber and waterproof cloth, for men and women, certain other classes of garments for women will be manufactured. Operations were recently begun with a large stock of materials, and the rapid growth of the plantation industry in the Dutch East Indies gives reasonable assurance that rubber for the principal product of the firm will not be wanting.

CRUDE RUBBER SWINDLE IN HOLLAND.

A rather ingenious scheme of some enterprising rascals has been discovered by the Amsterdam police. Letters have been sent broadcast telling of the existence in Amsterdam of a lot of crude rubber, not controlled by the Nederlandsche Overzee Trust, which had been smuggled into the country. The persons addressed are solicited to take shares in this rubber, and to forward proportionate sums for expenses, commissions, etc. The fact that some time ago a lot of 150,000 kilograms of crude rubber was smuggled into Holland in shipments of tobacco gave some semblance of possibility to this story but this rubber is now under control of the N. O. T., and under no circumstances will it be released. The police have sent out warnings, but as far as can be learned no arrests have yet been made.

RUBBER COMPANY'S CONTRIBUTION.

A press dispatch from Berlin of March 9, makes the announcement that the first subscription to the sixth German war loan was made by the Continental Caoutchouc & Gutta Percha Co., of Hanover, and amounted to \$2,500,000.

THE RUBBER TRADE IN JAPAN.

By Our Regular Correspondent.

ACCORDING to the official statistics, 1916 imports of crude rubber into Japan showed an increase of 2,727,832 pounds, and \$1,897,209 in value over 1915. This was due to double the previous home demand and a greatly developed export market.

IMPORTS OF CRUDE RUBBER.

From—	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
British India	1,114,441	\$470,329	1,334,337	\$743,582
Straits Settlements	2,017,176	863,593	4,648,894	2,484,147
Dutch East Indies	299,774	113,083	174,600	82,609
Great Britain	352,164	196,865	351,150	240,188
United States	98,430	58,819	92,248	67,415
Other countries	21,565	13,109	30,153	5,064
Totals	3,903,550	\$1,715,798	6,631,382	\$3,613,005

IMPORTS OF RUBBER MANUFACTURES.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Reclaimed rubber and unvulcanized rubber	168,060	\$26,822	267,596	\$42,256
Dental rubber	15,527	29,003	21,570	49,975
Soft:				
Rods and cords	55,910	22,941	111,399	47,792
Plates and sheets	72,641	18,656	81,609	27,390
Tubes	49,004	15,120	140,694	43,662
Belts and beltings for machines	28,490	10,356	45,670	21,170
Threads, strips, bands, rings and washers	36,878	45,660	63,128	86,584
Other soft goods	5,878	4,386	11,058	7,983
Hard:				
Lumps, bars or rods, plates and sheets	7,777	7,868	12,560	11,776
Other hard goods	11,304	2,512	7,361	4,375
Bicycle tires	37,348	40,735	7,779	10,460
Insulated electric wire:				
(1) Armored with metals:				
Submarine telegraphic or telephonic cables		154,637		647,330
Other armored cables	531,390	53,956	4,494	796
(2) Other:				
Flexible cords	40	31	72	32
Other cords	4,693	2,440	26,264	10,723
Rubber boots	4,434	7,270	9,797	21,736
Rubber overshoes	21,500	11,454	31,240	19,307
Woven beltings for machines and hose	173,984	94,984	202,607	144,891
Waterproof tissues	24,740	16,637	15,808	13,212
Elastic webbing, cords and braids		26,592		55,074
Insulating tapes	48,118	18,524	37,751	14,008
Totals		\$610,584		\$1,270,494

In addition to the above imports of rubber goods for 1915 and 1916, automobiles and parts (including tires) were imported to the value of \$356,743 in 1916 against \$82,633 in 1915 and bicycles and parts (exclusive of tires) to the value of \$238,807 in 1916 against \$156,501 in 1915.

These, including increased imports of submarine telegraphic and telephonic cables, rubber boots, and overshoes, have not been made in sufficient quantity, nor as well, in Japan. The demands for reclaimed rubber have been gradually increasing. Waste rubber produced in Japan in 1916 amounted to about 50,000,000 pounds [\$175,000], 60 per cent being used for 300,000 pairs of bicycle pedals [\$50,000], 2,000,000 pairs of "Zori" soles [\$120,000] and 1,000,000 pairs of "Tabi" soles [\$150,000], and the remaining 40 per cent for other goods.

EXPORTS OF MANUFACTURED RUBBER GOODS.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Insulated wire	1,930,651	\$449,776	2,070,491	\$562,816
Rubber tires	1,512,569	1,706,315	2,789,632	2,038,139
Druggists' sundries	unknown	.....	.....	333,985
Totals .....	.....	\$2,156,091	.....	\$2,934,940

Jinrikishas were also exported to the number of 9,465 [\$170,743] in 1916 against 7,931 [\$129,564] in 1915, and bicycles and parts (exclusive of tires) to the value of \$806,815 in 1916 against \$277,326 in 1915. Moreover, in 1916, there were exported rubber dolls, balls and balloons to the value of about \$500,000 and 1,200,000 valves for bicycle and automobile tires to England, United States and Australia. A new line of exports to Singapore consisted of 6,145,796 [\$110,247] porcelain latex cups and 1,565,621 [\$32,492] glass latex cups.

Japanese manufacturers were hampered by double the normal price of coal and four or fivefold increases in the prices of ingredients, but their troubles were lessened by large production and some firms were able to declare dividends of 10 to 40 per cent. Makers of druggists' sundries, toys and balloon fabrics exported their goods to England, British India, Canada and the United States mostly through Japanese traders in Yokohama or Kobe. Rubber tire makers consumed about 1,800,000 valves, 80 per cent of this number of tires being exported. Home demands increased 20 per cent above the 1915 consumption. Mechanical rubber goods production was about double that of the preceding year, consisting for the most part of hose and packing.

Several small companies were organized during 1916 and most of the well-established firms enlarged their factories to increase capacity. The Kono Rubber cloth works at Tokio, which was burned last summer, has been rebuilt during the winter and The Fujikura Electric Wire Co., Limited, also in Tokio, and one of the largest electric wire works in Japan, which was destroyed by fire in the winter at a loss of about \$150,000, will also probably be rebuilt under the new factory law which went into effect September 1, 1916.

DUNLOP FAR EAST CO. REORGANIZES.

The Dunlop Rubber Co. (Far East), Limited, of Japan, held a meeting of creditors at the company's offices, Wakinohama, Kobe, on February 16. The company was placed in voluntary liquidation for the purpose of transferring the business to a new corporation to be organized under the laws of the Empire of Japan. The new corporation, which will have the title of The Dunlop Gomu Kabushaki Kaisha Corporation, will take over all the assets and liabilities of the old company and continue the business under the same management.

JAPANESE POTASSIUM CHLORATE INDUSTRY GROWS.

Since the outbreak of the European war the number of firms manufacturing potassium chlorate in Japan has increased from one to at least eight, and production has increased from 300 to over 3,500 tons a year, much of it being exported to China, Russia and the South Sea Islands. Firms manufacturing this product must have the permission of the government in order to export it.

BRAZILIAN NOTES.

THE competition of Eastern rubber is one of the gravest questions which Brazil is to-day called upon to face. The tremendous increase in the production of plantation gum, and its steadily diminishing cost of production places this country in the position which necessitates a similar decrease in the expense of gathering and forwarding this country's product. The Para and the Amazonas state governments recognize this necessity, and are encouraging agricultural expansion, with the object of producing at home the various food materials which are now imported at high cost.

The financial crisis, which commenced prior to the European conflict, but which was undoubtedly heightened by that conflict, appears to have diminished in effect and steadily improved conditions are confidently predicted.

TELEGRAPH COMPANY PROSPERS.

The Amazon Telegraph Co., whose lines extend more than a thousand miles up the Amazon, has had a successful year, its net profits showing a gain of £6,886 over that of 1915. The line is now double the entire distance from Para to Manaus, each being on a separate route, thus lessening the liability of failure of communication through freshets, windfalls, or interference by the natives. It is now very seldom that both lines are simultaneously out of commission.

Mr. Keith's position as chairman and managing director has been filled by the appointment of F. E. Nosworthy, who was in complete control of the company's Amazon business, and who made the survey for the second line in 1907 to 1909 and superintended the completion of that project in the two following years. He predicts a brilliant outlook for the company's business the present year, largely based on the prosperity of the rubber and cocoa production of the Amazon basin.

A GROWING BRAZILIAN RUBBER FACTORY.

A well-equipped rubber factory employing 30 workmen and producing a variety of mechanical goods is one of the industries of Sao Paulo, Brazil. It was founded four years ago, is owned by Theodoro Putz & Cia., and represents a capital investment of \$35,000.

The factory, located at 179 Abilio street, is equipped mainly with British and German machinery consisting of the usual washers, mixers, calenders, vulcanizers, etc., all driven by electric power.

The principal manufacture consists of solid tires of several kinds for auto trucks and heavy vehicles. A large variety of mechanical goods is manufactured. Car springs, electrical articles, hose, tubing packings, cylinders for coffee and rice machines, heels, etc., in fact, almost every kind of rubber goods except tire casings, inner tubes and fabrics. The crude material is mainly mangabeira rubber, produced in the State of Sao Paulo, and Amazon grades, shipped direct from Para.

TRINIDAD RUBBER SHIPMENTS INCREASING.

For the month of January, 1917, shipments of crude rubber from Trinidad totaled 1,164 pounds, all of which was sent to the United Kingdom. During the same month in the years 1912, 1913, 1915 and 1916 no shipments are recorded, and in January, 1914, only 105 pounds were exported.

RUBBER FOOTWEAR DUTIES IN COLOMBIA.

Duties on merchandise imported into Colombia are levied on the gross weight (so much per kilo = 2.2 pounds), which includes paper, cartons, and the case, box or crate in which the goods are packed. Shoes wholly of rubber are dutiable at \$1 per kilo; cotton duck uppers, with rubber soles, \$1.50 per kilo, and linen uppers with rubber soles, \$1.70 per kilo.

Rubber Planting Notes.

INSURING THE PURCHASE OF HEALTHY RUBBER SEED.

A PRACTICAL means of ascertaining the proportion of healthy seed in a large quantity is suggested by C. M. Hamaker in the "Netherlands-India Rubber News."

Out of a shipment ready for transportation, 100 healthy and 100 sickly seeds are taken, opened and weighed. The latter are easily found by their much lighter weight, usually about 2 grams.

The seed for shipment is then placed in boxes or bags by means of a measure containing 100 seeds. The number of the measures thus packed into each box or bag being counted, it is an easy matter to ascertain the total.

As the average weight of a healthy seed can be computed, it is simple to determine what proportion of the total contents is composed of healthy seeds. The difference between the calculated and the actual weight, divided by the difference in weight of a healthy and a sickly seed, gives approximately the number of the latter which must be in the box.

FIRE LOSS AND RESPONSIBILITY.

A very considerable loss of young rubber trees is reported on the United Temiang (F. M. S.) Rubber Estates, nearly a hundred acres of four-year-old trees being damaged by a fire which spread from a neighboring estate owned by Japanese. A judicial decision has been obtained finding the Japanese owner liable for the damage done, the amount to be paid by him being referred by the Court to an arbitrator.

BRITISH NORTH BORNEO PRODUCTION INCREASES.

While the exact figures for 1916 are not yet available, it is estimated that the rubber production of British North Borneo increased 1,140,000 pounds over that of the calendar year 1915. There are now 24 rubber producing companies, a gain of five over the previous year.

PROGRESS OF HEVEA PLANTING IN BRITISH GUIANA.

According to the government report for 1915 the planting of *Hevea* in British Guiana is increasing slowly. It is estimated that at the end of that year nearly 5,000 acres had been planted with *Hevea*. The Department of Agriculture sold 23,000 young trees to planters that year.

The report goes on to say that it has been conclusively proven that this Para rubber tree grows well on suitable lands in the colony and that tapping is just beginning, as the majority of the trees in the planted area are young. These initial tappings of five and six year old trees have shown that the yields of dry rubber per tree compare very favorably with those obtained in the Straits Settlements, Malaya and Ceylon, and that the quality of the product is excellent. Tapping operations will be on a far larger scale hereafter.

The balata industry, which had suffered adversely at the commencement of the war, had practically quite recovered by the beginning of April, 1915, and bleeding operations were pursued as hitherto during the period. The quantity of balata exported during the year was 1,557,213 pounds. Fourteen companies and individuals controlled this output.

PERU'S RUBBER EXPORTS.

The Peruvian Government recently published statistics of foreign trade for the calendar year 1915, which show that crude rubber exports from that country during that period amounted to \$2,937,891, compared with \$2,169,445 in 1914.

LIMA BEAN AS A COVER CROP IN RUBBER PLANTING.

In Java extensive use is made of the lima bean (*Phascolus lunatus*) as a cover crop on rubber plantations. This legume, locally called Kratok, is sown and allowed to run on the ground between the rows of rubber trees, leaving a clean, cultivated strip of land in which the trees are growing. The vines are cut back from time to time so as not to interfere with the tapping and collection of latex, and of course are not allowed to climb the rubber trees.

In addition to its value as a nitrogen gatherer, the lima bean is valuable in preventing soil evaporation in the dry season, and in impeding soil erosion during the wet season. It is also of exceptional value for smothering weeds. The usual procedure is to plow and harrow, plant three seeds in each hill, the hills being from 20 to 40 inches apart, and give one or two hoeings to clear away weeds until the plants are well established.

DUTCH EAST INDIA PROSPEROUS.

The Dutch East Indies are producing a steadily increasing quantity of rubber. In 1916 this amounted to about 12 per cent of the world's total production. Experts declare that rubber will eventually head the list of agricultural exports from these islands. Plantation rubber has gained so greatly over forest production that even if prices drop considerably after the war, the plantations can still sell at a profit, whereas work in the South American forests will have to be curtailed.

The chances of competing successfully with the British East Indies are held to be favorable. The plantations in Ceylon and the Straits Settlements cover an area twice that of those in the Dutch East Indies. The climates and soil correspond, and the average yield per tree under similar conditions is practically equal. But labor is cheaper and more easily obtained in the Dutch East Indies and the taxes and duties are lower than in Ceylon and the Malay States. Dutch planters are therefore able to produce rubber at a lower cost than their competitors. The fact that British planters are highly taxed for war expenses gives the Dutch planters an added advantage.

The prospects for 1917 are very satisfactory. The United States was a large buyer in 1916, the total exports to that country being 9,500 tons. The figures for 1917 are expected to be still more favorable. Numerous companies have already sold a great part of their 1917 crop to United States buyers at very profitable prices.

FUNTUMIA RUBBER IN THE CAMEROONS.

Rubber has become an increasingly important product of the Cameroons. Until just previous to the European war the exports of this product formed nearly 50 per cent of the total exports, amounting, in 1913, to a value of \$2,804,220. The first attempts at rubber exploitation were made in the northern part of the colony, where the *Landolphia florida*, which was then regarded as the greatest rubber-producing plant, was found. About 1901 the vast forests of Southern Cameroon were discovered to contain great numbers of *kickxia* trees, and the natives were soon set to gathering the "silk rubber" therefrom; but their methods were crude, and resulted in the destruction of so many trees that the movement soon fell off. The rubber crisis of 1912 also caused a decrease in the wild-rubber trade, but at the same time it gave considerable impetus to the establishment of rubber plantations.

Realizing that the *Funtumia* (*Kickxia*) *Elastica* was indigenous to the Cameroons, the German planters commenced to cultivate it about four or five years ago, and now there are many plantations containing thousands of trees that will soon

begin to produce large quantities of first-quality plantation rubber. "The Journal of the Royal Society of Arts," referring to the cost and method of production, says the cost of the upkeep of planted areas is calculated at about 30s. per acre for the first year, 22s. for the second, 18s. for the third, and 10s. for the fourth. The trees begin to bear during the fifth year, and it is said that over 1½ pounds of dry rubber may be obtained from a six-year-old *Funtumia* tree. The cost of tapping the trees and shipping the product to Europe should not exceed 1s. 3d. per pound, and, if properly prepared, it is the belief of that journal that the Cameroon plantation rubber will fetch about the same price as the best Para rubber in European markets. Native labor is fairly plentiful in the rubber-growing districts and costs, including board, about £1 per month. It is likely, therefore, that rubber will continue to prove the most important product of the Cameroons for many years.

THE SITUATION IN MALAYA AND JAVA.

By a Special Correspondent.

WILL Singapore become the world's market for rubber? The question is one which is being considered throughout the rubber-producing sections of the East. The general feeling here is that the war has not so far affected very severely the prosperity of the Malay peninsula. On the contrary, in many ways it has been distinctly favorable. Still, there are some changes noticeable, socially and commercially, which create comment and on which opinions differ. Principal among them is the so-called "American invasion." Americans are settling here. They are buying land and cultivating rubber. They are here attending the auctions, and buying rubber to ship direct to America. The closing of rubber auctions in Europe has caused this, and with this has come the question which heads this paragraph.

THE AMERICAN INVASION.

Yet there are many who are inclined to resent the increasing number of Americans, and their persistence and steady progress in the trade. Some of this is rightly attributable to loyalty to the mother-country, whence most of the capital came to establish and nurture the plantation industry. Yet there is no doubt that the presence of these busy, bustling Yankees is distinctly advantageous to Singapore as a market, and the whole of Malaysia as a rubber-producing country.

A CASE OF AMERICANOPHOBIA.

However, there are persons here who think otherwise. In a recent number of the "Malay Mail" a correspondent who signs himself "Anti-Yank," after expressing a certain amount of gratitude for the winding-up of the affairs of a "too numerous alien enemy competition," has quite a little to say about the success of the American encroachment upon the rubber tire industry in the Straits, and further expresses surprise in noting the way in which goods of American manufacture are being patronized to the detriment of the British manufacturers "who were the originators of the rubber tire industry."

The only apparent reason for this, according to the writer, is a lack of patriotism on the part of his countrymen.

MONEY PLENTY AND PLANTERS PROSPEROUS.

Notwithstanding the decline in the price of rubber, there seems to be about the normal amount of money in circulation, and retail traders reported a very good Christmas and New Year's trade, though, since then, general business has shown a tendency towards conservatism in some quarters. Rubber dealers are adopting a cautious policy, because of present price conditions. It is reported that at certain outstations some sizable parcels of Smoked sheet, which might be considered No. 1 in quality, have sold as low as \$100 a picul (42.6 cents per pound). Even at this price, however, it leaves a good margin of profit to the native producer.

TOO MANY TIGERS.

Planters in the Sepang district are having some difficulty in

maintaining their native labor forces, owing to a repetition of the assaults by tigers. Some native laborers have been killed, and this has caused desertions from the working forces. The planters are now demanding that the M. S. V. R. be called to exterminate these dangerous creatures.

THIEVERY AND INCREASED LICENSE FEES.

The increasing number of rubber thefts during the past year, and the dissatisfaction caused by the seeming inability of the police to prevent this practice, or to detect and punish the offenders, led to a proposed amendment, by which the fee for licenses granted to dealers who purchase rubber should be raised from \$25 to \$250 and the deposit from \$200 to \$2,000. This would have two effects, a lessened number of licensees, or a greatly enlarged sum available for better police protection, or both. The dealers protested, claiming that the proposed increase would interfere greatly with the entire rubber trade, but finally a bill has been rushed through, at a meeting of the Federal Council at Kuala Lumpur, by which the license fee is raised to \$100 and in place of a deposit of \$200 in cash, the licensee is required to enter into a bond with sureties for the due performance of the obligations imposed.

BATAVIAN STOCK TRADE LIST ADVISED.

The Rubber Trade Association of Batavia has sent a circular to its members, suggesting that meetings be held semi-weekly and that all free rubber on hand be listed so that no time may be lost, nor orders remain unfilled through difficulty in locating the required stock. It often happens that when an exporter receives an order from some foreign customer he frequently has to scour the entire market. Not infrequently a lot of rubber which has been offered subject to acceptance of the foreign customer has been sold before such acceptance has been forwarded. Then the exporter may be obliged to spend a considerable amount of time, and some money, to locate available rubber to fill such belated order. The semi-weekly listing of all rubber on hand, its quality and price, would be beneficial to both buyer and seller, and the circular mentioned asks for coöperation in the movement for the simplification and consequent improvement in business.

PALE CREPE SAMPLE STANDARDS.

All sales contracts made under the rules of the Rubber Trade Association of Batavia, as decided at a general meeting held last June, stipulated that any certain quantity of rubber purchased must be delivered with a minimum of 75 per cent Pale crepe according to the standard samples of the society. A circular sent out by the society emphasizes that in no single instance of the established rules a word was spoken of a "color-shade," in this connection. The reason why the term "color-shade" was avoided was because the various conceptions of certain colors are so divergent. Many disputes have arisen between buyer and seller, which are not always easily adjusted, because a single standard Pale crepe sample does not exist, and cannot be prepared.

There are three established standard samples: First quality crepe numbers 1, 2 and 3; and these terms, and no others, are advised in selling contracts.

INTERPLANTING COCONUT GROVES WITH RUBBER.

A report comes from the Lunas Rubber Estate that owing to the continued unsatisfactory conditions of its coconut harvest the management has decided to interplant its coconut area with rubber. The estimated crop for the next financial year is 175,000 pounds of rubber and 60,000 coconuts.

A NEW DUTCH TRADING CORPORATION.

A new company, with the support of, and in conjunction with, the Netherlands Trading Co., has been formed under the name of the Holland-Ceylon Handels Maatschappij with a capital of 200 million guilders [\$80,000,000] and will conduct important trading operations in the Far East.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED FEBRUARY 20, 1917.

- N**O. 1,216,278. Rim for vehicle wheels. R. S. Bryant, assignor to The Standard Welding Co.—both of Cleveland, Ohio.
 1,216,279. Rim for vehicle wheels. R. S. Bryant, assignor to The Standard Welding Co.—both of Cleveland, Ohio.
 1,216,288. Suction cups for the ends of sock-supporter. H. A. Davis, Chicago, Ill.
 1,216,425. Inflatable toy. M. H. Eiseman, Chicago, Ill.
 1,216,457. Swimming device. M. Jelalian, Cranston, R. I.
 1,216,464. Dual-tire grip. W. B. Lashar, assignor to American Chain Co.—both of Bridgeport, Conn.
 1,216,648. Eraser device. J. Auld, Chicago, Ill.
 1,216,666. Bottle brush. O. H. Dorsch, Brooklyn, N. Y.
 1,216,679. Device for preventing snoring. G. A. Foster, Chicago, Ill.
 1,216,732. Fountain pen. J. M. Reed, Brooklyn, N. Y., assignor to Eagle Pencil Co., New York City.
 1,216,823. Demountable rim. R. McClure, Gilman, Mont.
 1,216,826. Pneumatic tire. J. A. McTaggart, Philadelphia, Pa.
 1,216,851. Pneumatic tire. O. Schultz, New York City.
 1,216,870. Anti-skidding device for pneumatic tires. J. J. Snigo, Pittsburgh, Pa.
 1,216,893. Vehicle tire. M. Vierengel, Brooklyn, N. Y.
 1,216,916. Detachable tire. P. W. Anderson and J. T. Kennelly, Rawlins, Wyo.
 1,216,991. Hose-supporter. C. J. Hausen, New York City.
 1,216,995. Tire tool. L. H. Hodges, Silverton, Tex.
 1,217,009. Tire removing and applying device. G. L. Kavanagh, Montreal, Quebec, Canada.
 1,217,014. Sanitary bandage. E. A. Knieriem, New York City; G. P. Hotaling, executor of E. Knieriem, deceased.
 1,217,124. Puncture-proof spring-tire. W. McCall, M. O'Sullivan, and E. C. McCall, San Francisco, Calif.
 1,216,285. Regulator for anesthetic apparatus. A. W. Cash, assignor to H. Mueller Manufacturing Co.—both of Decatur, Ill.
 1,216,853. Tire valve. M. C. Schweinert, West Hoboken, and J. Volckhausen, Weehawken—both in New Jersey.

ISSUED FEBRUARY 27, 1917.

- 1,217,144. Demountable rim. H. J. Bradt, Royal Oak, Mich.
 1,217,167. Galosh. J. W. Gannon, Broadway, Mangaweka, New Zealand.
 1,217,232. Tire. N. Squier, Clifton Springs, assignor of one-half to J. N. Mead, Ithaca—both in New York.
 1,217,270. Non-slipping cover for pulleys. T. J. Cahill, San Francisco, Calif.
 1,217,277. Toy balloon. C. H. Cohn, Chicago, Ill.
 1,217,407. Solid tire. C. S. Burton, Oak Park, Ill.
 1,217,441. Nursing-Vest. V. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York City.
 1,217,442. Non-skid device for motor-vehicles. G. Gunther and W. P. Miller, Los Angeles, Calif., assignors to G. Gunther.
 1,217,458. Wheel-rim. R. W. Jordan, Holderness, N. H., assignor to Jordan Demountable Rim Co., Boston, Mass.
 1,217,486. Wire tube tire. R. Moskowitz, assignor of one-half to J. Gewirtz—both of New York City.
 1,217,499. Boot-tree. N. E. Raber, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
 1,217,560. Inner tube for pneumatic tires. J. H. Brown, West Hoboken, N. J., assignor to C. E. Bonner, Champaign, Ill.
 1,217,568. Cushion-tire. E. P. Conway, Waterbury, Conn.
 1,217,619. Wire tread tire. A. E. Molin, Rockford, Ill.
 1,217,665. Cushion-tire. P. D. Thropp, assignor to The De Laski and Thropp Circular Woven Tire Co.—both of Trenton, N. J.
 1,217,754. Inner tire. J. H. Grube, Los Angeles, Calif.
 1,217,756. Swimming device or life-preserver. F. Guethoff, Three Rivers, Mich.
 1,217,777. Tire-tool. W. A. Kinsolving, Washington, D. C.
 1,217,824. Inflated apparatus for preventing drowning and assisting swimming. J. J. Pritchard, Mosley, Birmingham, England.
 1,217,881. Plug for rubber heel treads. G. E. Rollins, Brockton, Mass.
 1,217,888. Puncture sealing tire. W. W. Wildman and E. A. Tinsman, Barberton, assignors of one-third to J. Christy Cleveland—both in Ohio.

ISSUED MARCH 6, 1917.

- 1,217,900. Self-filling fountain pen. H. C. Bartlett, Jr., Owensboro, Ky.
 1,218,004. Lamb-blanket, comprising a waterproof cover and elastic loops. H. Sayles, Meeteetse, Wyo.
 1,218,111. Tire valve dust cap. F. Nielsen, Boston, Mass., assignor to A. Schrader's Sons, Inc., Brooklyn, N. Y.
 1,218,119. Tire-gage. J. A. Robertson, Richmond, assignor of one-half to W. A. Martin, Richmond—both of Virginia.
 1,218,319. Pedal-pad. G. H. Rivers, New York City.
 1,218,323. Burial-casket comprising a channeled rubber strip. I. Schmidt, Los Angeles, Calif.

- 1,218,431. Pneumatic tire armor embodying outer and inner plies of rubber, and an interposed layer of quills. A. V. McCrimmon, Beatrice, Nebr.
 1,218,478. Rectal applicator. C. T. Sappington, Frederick, Md.
 1,218,486. Pneumatic tire. E. Sterns, St. Louis, Mo., assignor to Efficiency Oil Corporation, Wilmington, Del.
 1,218,568. Insulating article composed partly of rubber. W. O. Kennington, assignor to Remy Electric Co.—both of Anderson, Ind.
 1,218,596. Insulating article composed partly of rubber. O. F. Conklin, assignor to Remy Electric Co.—both of Anderson, Ind.

ISSUED MARCH 13, 1917.

- 1,218,764. Device for extracting foreign substances from pipes. I. G. Hanlein, Newark, N. J.
 1,218,852. Toy comprising an inflatable balloon. B. R. Gilpin, Tygee Valley, Idaho.
 1,218,865. Tire retaining-ring. C. A. Hornburg, Devine, Tex.
 1,218,882. Closet spraying attachment comprising a circular deflatable tube. C. W. Macy, Converse, Ind.
 1,218,909. Life-Preserver, comprising an inflated float. N. Sinkovich, Omaha, Nebr.
 1,218,938. Demountable rim. J. S. Hemenway, River Falls, Wis.
 1,218,945. Demountable rim. C. S. Johnson, Glendive, Mont., assignor of one-fourth to C. H. Crockard and one-fourth to S. H. Clark, Bismarck, N. D.
 1,218,948. Eraser attachment for fountain pens. D. R. Markley, Lancaster, Pa.
 1,218,982. Rubber in cork and leather substitute. A. L. Clapp, Braintree, Mass.
 1,219,033. Puncture proof layer for tires. L. S. Odell, Forestville, N. Y.
 1,219,058. Artificial eye. P. Weber, New York City.
 1,219,064. Vehicle-wheel rim. R. W. Ashley, New York City, assignor of one-half to F. Oberkirch, St. Marys, Pa.
 1,219,065. Vehicle-wheel rim. R. W. Ashley and F. Oberkirch, New York City.
 1,219,084. Elastic cord for ends of knitted tires. E. T. Church, New Rochelle, and W. E. Webb, Jr., Larchmont—both in New York, assignors to Reinforced Cravat Corporation, New York City.
 1,219,088. Tire-chain. H. C. Davis, Cambridge, Ohio.
 1,219,163. Leather pneumatic tires. J. B. Salmon, Dunedin, New Zealand.
 1,219,232. Waterproof bag for bathers. J. J. Blumberg, New York City.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

ISSUED FEBRUARY 7, 1917.

- 14,535 (1915). Valve, comprising a rubber part, for gas inhalers. L. B. Hall, 28 Station Road, Winchmore Hill, Middlesex.
 14,569 (1915). Horseshoe with rubber calks. D. Young, Jackman's Temperance Hotel, West street, Reading.
 14,613 (1915). Collapsible bath comprising a waterproof sheet. B. F. Adams, Albuquerque, New Mexico, U. S. A.
 14,616 (1915). Reservoir pen. W. H. Brecknell, 28 Meadow street, Weston-super-Mare.
 14,658 (1915). Self-sealing inner tube. A. C. Reliance Co., 2 Rector street, New York City, U. S. A.
 14,681 (1915). Valve with rubber disks, for closing barrels when the tap is withdrawn. J. Bayne, 5 Brownsville Road, Heaton Moor, Stockport.
 14,703 (1915). Rubber strap for fastening a child's bottle to a cradle, etc. E. Halford, 56 High street, Naseby, Northamptonshire.
 14,742 (1915). Telephone plug comprising hard rubber sleeve. A. Marr, 23 Reynell Road, Longsight, Manchester.
 102,527. Piston packing, consisting of a ring of rubber expanded by one or more inflated rubber tubes. S. Dreyfus, Thorncliffe Villa, Windmill Lane, Denton, near Manchester.
 102,546. Inner tube with reinforced tread. T. M. Davies, and Stepney Spare Motor Wheel, Stepney Works, Llanelli, Carmarthenshire.
 102,570. Tire in which an outer cover encloses a core of spongy rubber. R. Fukuda, 7 Ichome, Yoshida-machi, Yokohama, Japan.
 102,577. A combined inflating and safety valve for pneumatic tires. H. B. Ashelman, 8 Broadway, and J. S. Johnson, 220 Fourth street, north—both in Fargo, North Dakota, U. S. A.
 102,613. Combination pneumatic and solid tire. B. Granville, 1476 Broadway, New York City, U. S. A.
 102,632. Ventilating means for waterproofing clothing. A. G. Pearson, and H. B. Pearson (trading as Pearson Bros.), 45 Conduit street, Bond street, London.
 102,634. Helmet made from cork applied by rubber cement to a cotton lining. E. W. Vero, 43 East Dulwich Road, London.

ISSUED FEBRUARY 14, 1917.

- 14,859 (1915). Top boot with waterproof extension. R. G. Margetsen, 38 Dover street, Piccadilly.
- 14,948 (1915). Bead protector. H. L. Swain, 237 Deansgate, Manchester.
- 102,648. Bottle stopper comprising a rubber ring. E. A. Matthias, 6 Stanley street, Liverpool.
- 102,702. Non-skid chain. F. Nace, South Broad street, Trenton, New Jersey, U. S. A.
- 102,716. Inner tube comprising gas inflated sections. P. Harder, 13 Nordre Frihavsgade, Copenhagen.
- 102,731. Stiffeners for corsets made of wire twisted, woven, or plated and covered with rubber and vulcanized. E. Lawrence, National Bank, Melbourne, Australia.
- 102,799. Puncture proof band. A. Baigne, 439A Beaudry street, Montreal, Canada.

ISSUED FEBRUARY 21, 1917.

- 15,001 (1915). Rubber covered pneumatic roller. J. Muskett, 42 Delamere avenue, Swinton Park Road, Fendleton, Manchester.
- 15,080 (1915). Life-saving suits. I. Gilbert, 6814 South Halsted street, Chicago, Illinois, U. S. A.
- 15,195 (1915). Rubber or gutta-percha used in making artificial stone. M. I. Poznanski, Hotel National, Quai du Leman, Geneva.
- 15,269 (1915). Leather substitute with rubber layer. A. L. Nielsen, 47 Mariendalsvej, Copenhagen.
- 15,341. Tire tool. T. Clark, 20 Frazer street, and T. Watson, Douglas Road—both in Workington, Cumberland.

ISSUED FEBRUARY 28, 1917.

- 15,380 (1915). Rubber heel tread. J. R. Bailey, 78 Rose avenue, Akron, Ohio, U. S. A.
- 15,386 (1915). Tire valves and method of attachment to tires. A. E. Henderson, 503 Kent Building, Toronto, Ontario, Canada.
- 15,397 (1915). Printers' blanket. J. F. Haskins, 159 West 103rd street, New York City.
- 15,411 (1915). Life-saving garment. J. E. Lomas, Post Office box 559, Smuggler, Col.
- 15,674 (1915). Solid tire with rubber band and rubber tread studs. T. Stewart, "The Knowe," Erngath Road, Bo'ness, Linlithgowshire.

THE DOMINION OF CANADA.

ISSUED NOVEMBER 30, 1916.

- 172,967. Tire armor. J. W. Hayes, Trenton, Ont.
- 173,003. Rubber and fiber sole. T. C. Redfern, Hyde, Chester, England.
- 173,024. Mold for hot water bottles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of E. Stahl and W. Klein—both of Nantawick, Connecticut, U. S. A.
- 173,046. Tire tool. J. M. Barrie, Stockton, and E. F. Euclid, Livermore, assignee of a half interest—both in California, U. S. A.
- 173,068. Sectional pneumatic tire. J. Girard, Montreal, Quebec.
- 173,085. Combination raincoat and petticoat. D. Dandurand, Montreal, Quebec.
- 173,111. Recoil pad for guns. W. R. Jorgenson, Chicago, Illinois, U. S. A.
- 173,123. Syringe. C. L. Löffler, Minneapolis, Minnesota, U. S. A.
- 173,184. Rubber bottle cleaning brush. The Sanitary Bottle Washing Co., Limited, assignee of E. Schwarz—both of Chicago, Illinois, U. S. A.
- 173,214. Rubber horse-shoe pad. R. Welling, assignee of J. J. McMullen—both of Buffalo, New York, U. S. A.
- 173,217. Metal plug for rubber heels, etc. F. Berenstein, Chelsea, and W. Berenstein, Boston—both in Massachusetts, U. S. A.
- 173,229. Combined tire valve and rubber patch. C. E. Baker, Carmarthen, Carmarthenshire, Wales.
- 173,240. Tire valve cap. R. A. Campbell, Minneapolis, Minnesota, U. S. A.
- 173,279. Medicine dropper. F. C. La Grange, Cedar Rapids, Iowa, U. S. A.
- 173,361. Teat cup. The Empire Cream Separator Co., assignee of A. C. Macartney—both of Bloomfield, New Jersey, U. S. A.
- 173,416. Section cup massage instrument. J. W. Bond, Providence, Rhode Island, U. S. A.
- 173,488. Belt for machinery. W. J. Sadler, Montreal, Quebec.
- 173,491. Tire. D. H. Shapiro, Montreal, Quebec.
- 173,494. Fabric glove with rubber impregnated palm and fingers. J. P. St. John, New Haven, Connecticut, U. S. A.
- 173,499. Tubular fabric for tires, hose, etc. L. A. Subers, Cleveland, Ohio, U. S. A.

THE FRENCH REPUBLIC

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 481,850 (August 21, 1915). Perfection in pneumatic automobile tire automatic air discharge. A. Broussols.
- 481,393 (April 4, 1916). Elastic wheels. A. J. Anderson.
- 481,585 (April 25, 1916). Elastic wheel. J. E. Strietelmeier.
- 481,616 (April 28, 1916). Improvements in pneumatic tires. E. H. Rerrick.
- 481,673 (May 6, 1916). Elastic cushion saddle for bicycles, motorcycles, and other similar vehicles. E. Mariani and S. Radalle.
- 481,680 (May 8, 1916). Hot water bottle with protecting cover; other analogous articles of rubber and the process of their manufacture. E. Rowe.

- 481,796 (May 19, 1916). Cellular tires for automobile wheels. J. C. Anderson.

NEW ZEALAND.

ISSUED JANUARY 18, 1917.

- 38,157. Milking machine teat cup. The Wolseley Sheep Shearing Machine Co., Limited, Sidney Works, Alma street, Aston, Birmingham, Eng.
- 37,051. Rubber sole and heel pad. W. W. Phillips, 142, 144, and 146 Old street, London, England.
- 38,280. Pneumatic tires. J. C. Barker, 14-20 St. Mary Axe., London, England.

DESIGNS.

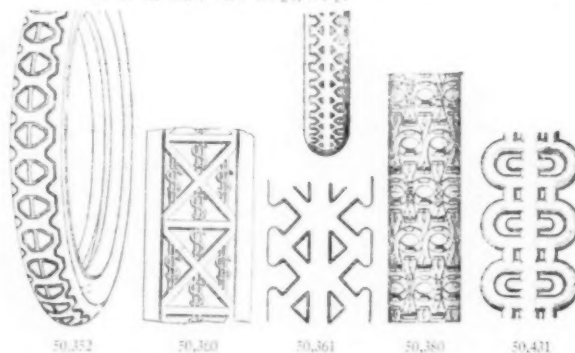
THE UNITED STATES.

- 50,389. Jar-ring. Term 14 years. Patented February 27, 1917. C. W. Joslin, Cleveland, Ohio, assignor to Mechanical Rubber Co., Passaic, N. J.

DESIGNS FOR TIRES.

THE UNITED STATES.

- 50,352. Automobile tire. Term 14 years. Patented February 20, 1917. R. H. Kenton, San Francisco, Calif.
- 50,360. Automobile tire. Term 3½ years. Patented February 20, 1917. C. B. Reynolds, Sawtelle, Calif.
- 50,361. Automobile tire. Term 14 years. Patented February 20, 1917. W. A. Robbins, Glen Ridge, N. J.



- 50,380. Tire-tread. Term 14 years. Patented February 27, 1917. W. D. Freese, Akron, Ohio.
- 50,431. Tire-tread. Term 14 years. Patented March 6, 1917. D. Spence, assignor to The Norwalk Tire & Rubber Co.—both of Norwalk, Conn.

THE DOMINION OF CANADA.

- 4,156. Tire tread—a tread which is provided with ribs of herring bone form flattened at their central portions, at each side of the median plane being an oval-shaped depression formed in each rib. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ontario.
- 4,157. Tire tread—a tread provided with ribs of herring bone form flattened at their central portions, at each side of the median plane being two round-shaped depressions formed in each rib. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ontario.

TRADE-MARKS.

THE UNITED STATES.

- 98,686. The words RIE NIE—rubber filler and cement, patching cement, vulcanizing cement, soldering paste, and auto-patch. Durkee-Atwood Co., Minneapolis, Minn.
- 99,839. The word BRIGADIER—rubber pneumatic tires. Continental Rubber Works, Erie, Pa.
- 100,007. The word ROADBEATER—rubber tires. The Gordon Tire & Rubber Co., Canton, Ohio.
- 100,096. The representation of a heel, with six circles and the words NATIONAL SAFETY HEEL thereon—rubber heels. Hanover Rubber Co., Hanover, Mass.
- 100,150. A circular design—elastic vehicle tires. The American Rubber & Tire Co., Akron, Ohio.
- 100,323. The word SHERICO—rubber tires. Southern Hardware & Bicycle Co., Jacksonville, Fla.
- 96,844. The words PIG SKIN—machinery packing made partly of rubber and partly of asbestos. The Manhattan Rubber Manufacturing Co., New York City.
- 97,227. The words "TINKER" DELIVERY SYSTEM—rubber-stamp outfit and inking pad combined. M. Tinker, Baltimore, Md.
- 98,839. The word PHYEUR—a rubber composition in sheet form. The Manhattan Rubber Manufacturing Co., New York City.
- 100,073. The word STANWAL—rubber matting. Standard Woven Fabric Co., Walpole, Mass.
- 92,753. A representation of an oval figure—rubber bumpers for closet-seats, rubber stoppers for lavatories, sinks, and bath, rubber screw and tack bumpers, and closet-seats. L. R. Lenich, Union City, Ind.

- 96,833. The words WHIP CORD—hose made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 97,498. The word SANDOW—belting, hose and packing. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 100,260. A representation of an oak leaf with the word OAKLIKE thereon—a substitute for leather and rubber. A. L. Hatfield, Hillside, N. J.
- 100,340. The word MADERITE—water-bottles, fountain-syringes, combination-syringes, face-bags and ice-bags. The Seamless Rubber Co., New Haven, Conn.
- 100,450. A representation of a wigwag within the letter Q—rubber soles and heels. Quabaug Rubber Co., Brookfield and North Brookfield, Mass.
- 100,624. The figures and letter 62-B—hard-rubber acid conducting pipes. India Rubber Co., New Brunswick, N. J. and New York City.
- 100,766. The word APOLLO—suspenders, belts, and garters. J. Ziff, Detroit, Mich.
- 101,024. The word WILLOW—inner tubes. The Standard Tire & Rubber Co., Cleveland, Ohio.
- 101,025. The word OKIDE—composition insoles, box-toes and heel-counters for boots and shoes. United States Rubber Co., New York City.
- 101,026. The word SOLEX—composition insoles, box-toes and heel-counters for boots and shoes. United States Rubber Co., New York City.
- 101,063. A representation of a tire bearing a large letter F—rubber tires. The Fisk Rubber Co., Chicopee Falls, Mass.
- 101,065. The word NEOLIN—soles and heels for boots and shoes formed of an artificial composition. The Goodyear Tire & Rubber Co., Akron, Ohio.
- 101,133. The word RESILIO—rubber heels and composition soles. Sears, Roebuck & Co., Chicago, Ill.
- 100,160. Design comprising an albatross and a shield with the letters ALBATROS—belting and hose. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 100,161. Representation of a seal with the word BLUE above and SEAL below—belting and hose. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 100,547. The words KLAY KORT within an oblong border—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,548. Design containing the word LAKESIDE—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,549. Design containing the word BAYSIDE—rubber boots and shoes, rubber overshoes and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,550. Design containing the word FENWAY—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,817. The words MONKEY GRIP—automobile-tire patches. Auto Supply House, Oklahoma, Okla.
- 100,926. Representation of a key placed diagonally across a shield design—inner tubes, liners and patches for the same. Keystone Rubber Manufacturing Co., Erie, Pa.

THE UNITED KINGDOM.

- 376,110. Two circles one within the other, between both of which is written the words NORTH BRITISH RUBBER CO., LIMITED, EDINBURGH, SCOTLAND, in the center the emblem of Scotland. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 376,275. The word CONQUESTOR—boots, shoes, slippers, overshoes, leggings and garters. United States Rubber Co., Limited, 47 Farringdon street, London, E. C.
- 376,296. The word AQUAVICA—raincoats. Butt, Vosper & Knight, 103 Old Town street, Plymouth.
- 376,206. A representation of two perpendicular arrows—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 374,550. A design for a label for RESILIO DENTAL RUBBER—dental india rubber. Elliott & Co. (Edinburgh), Limited, 4 North St. David street, Edinburgh, Scotland.
- 376,387. A comic figure—golf balls. The Dunlop Rubber Co., Limited, 150 and 152 Clerkenwell Road, London, E. C.
- 376,388. A comic figure—golf balls. The Dunlop Rubber Co., Limited, 150 and 152 Clerkenwell Road, London, E. C.
- 376,389. A comic figure—golf balls. The Dunlop Rubber Co., Limited, 150 and 152 Clerkenwell Road, London, E. C.
- 376,390. A comic figure—golf balls. The Dunlop Rubber Co., Limited, 150 and 152 Clerkenwell Road, London, E. C.
- 375,756. The word MARKULCO—apparatus for vulcanizing tires. E. H. Jarvis, and H. W. Bradbury, trading as the J. B. Auto Specialties Co., 4 Hedgis Yard, Croydon, Surrey.
- 376,204. A representation of a shield bearing the letters N. B.—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 376,205. A representation of a swastika—golf balls. The North British Rubber Co., Limited, Castle Mills, Edinburgh, Scotland.
- 376,325. The word MATTAMAC—tires and tire treads, etc. A. G. Pearson and H. B. Pearson, trading as Pearson Bros., 29 Old Christ church Road, Bournemouth, and 45 Conduit street, London, W.

THE DOMINION OF CANADA.

- 22,087. The word YOLANDA—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.

- 22,104. The words BOECKH'S RUBBER SET and representation of a boar's head in a circle—brushes. The Boeckh Bros. Co., Limited, Toronto, Ontario.

- 22,180. The word RINEX—general mechanical rubber goods such as belting, tires, hose, packing, soles and heels. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec.

THE FRENCH REPUBLIC.

- 24,335. Two hands stretching a band, the word NEVERRIP above and "LA VRAIE MARQUE AMERICAINE DÉPOSÉE—sporting goods, and medical, surgical and toilet sundries. A. E. Fromont, 11 Madison avenue, New York, U. S. A.
- 24,336. Two hands stretching a band, the word NEVERRIP above and "LA VRAIE MARQUE AMERICAINE DÉPOSÉE—sporting goods, and medical, surgical and toilet sundries. A. E. Fromont, 128 Gower street, London, England.
- 24,337. Two hands stretching a band, the word NEVERRIP above and "LA VRAIE MARQUE ANGLAISE DÉPOSÉE—sporting goods, and medical, surgical and toilet sundries. A. E. Fromont, 128 Gower street, London, England.
- 24,353. A representation of a rhinoceros above a scroll bearing the word DERMATINE—rubber and rubber goods. Dermatine Co., Limited, 95 Neate street, Camberwell, London, England.

NEW ZEALAND.

- 12,959. An oval design with an illustration of a seal in the center, and forming a border around it the words DOMINION RUBBER CO., LIMITED—goods manufactured from india rubber and gutta percha. Canadian Consolidated Rubber Co., Limited, Notre Dame street, East, and Papineau avenue, Montreal, Quebec.
- 13,532. An oval design with an illustration of a seal in the center, and forming a border around it the words DOMINION RUBBER CO., LIMITED—clothing. Canadian Consolidated Rubber Co., Limited, Notre Dame street, East, and Papineau avenue, Montreal, Quebec.
- 13,414. The word USCO—pneumatic vehicle tires. United States Tire Co., 1790 Broadway, New York City, U. S. A.

AUSTRALIA.

- 19,233. The word DOMINION—india rubber and gutta percha goods. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.
- 20,722. The word DOMINION—articles of clothing. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.
- 20,752. An illustration of a bear standing on its hind legs, fore paws at back—india rubber and gutta percha goods. Perdrion Rubber Co., Limited, 270 George street, Sydney, N. S. W., Australia.

SPAIN.

- 28,703. The words CORREA DE BALATA "VINCITOR"—rubber belting. Gonzalez Erquicia & Co., Bilbao (Vizcaya).

SOCIETY OF AUTOMOTIVE ENGINEERS.

The Society of Automobile Engineers will change to the above name on the nineteenth of this month, after which time the engineers who were formerly members of the American Society of Aeronautic Engineers, the Society of Tractor Engineers, and engineers connected with the company members of the National Association of Engine and Bolt Manufacturers will be working together to further such standardization work as shall be feasible in their respective fields, and with the welfare of the nation at this time constantly in view. A preparedness committee is now in close touch with the government officials and securing information to render such assistance as is needed from the members of this Society. Arrangements are being made for the most elaborate meeting in its history, this summer, the announcement of time and place being withheld pending development of international conditions.

GERMANY EXPECTS TO RECOVER SOUTH AMERICAN RUBBER TRADE.

A writer in the "Vossische Zeitung" recently, while appreciating the greatly increased American, Japanese, Spanish and Swiss exports to South America since the outbreak of the war, reaffirms the belief that upon the coming of peace Germany can soon recover the greater part of her trade in many fields. "The market of the rubber factories," he states, "will meanwhile have passed into American and British hands, but in view of previous experiences the opinion is held that a great part of Germany's former customers will soon have resumed relations with her."

The Canadian Consolidated Rubber Co., Limited, Montreal, Canada, issue some excellent folders. A recent one, entitled, "Two Feet," is especially attractive in make-up, and convincing in argument.

Review of the Crude Rubber Market.

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NEW YORK.

MARCH has been a comparatively quiet month in the crude rubber market, with trading devoted to routine business and the supplying of small manufacturers' requirements. The uncertainty regarding the effect of war with Germany has produced what appears to be a policy of watchful waiting on the part of the heavy buying interests. Moreover, trade has been seriously obstructed by local freight embargoes and the railroad disturbance that for a time threatened the country has affected business adversely. While the volume of rubber arrivals has been about normal during the month, the recent heavy requisitions of British bottoms together with the fact that our government has notified certain shipping companies that their ships may be required, will undoubtedly have an ultimate effect on future arrivals. The shipping situation it would seem is beset with difficulties that are apparently growing worse instead of better.

Generally speaking, the demand for crude rubber has been spasmodic, resulting in minor price fluctuations that show a decline since March 1 of about 5 cents in plantations and 2 to 4 cents on Para sorts. On March 1, First latex and Smoked sheet ribbed, spot were quoted 87 cents in a strong market, with July-December at 75 cents. Upriver fine, spot was quoted 80 cents. The market softened early in the month and prices became easier until the middle of the month when a strong undertone developed, resulting in a slight price advance. The heavy buying interests, however, failed to support the prevailing prices and the market became easier later. On March 29 First latex and Smoked sheet ribbed, spot were quoted 82½ to 83 cents and July-December arrivals 73 cents; Upriver fine was quoted 77 cents. There appears to be very little spot rubber available, and interest in futures has been confined to inquiries that were quite active during the last week of the month. The general market conditions were strong and prices firm.

LONDON.

Early in the month there was a marked tendency to buy and much rubber changed hands despite the fact that spot supplies were not plentiful. The bullish interest, however, was arrested by the reports of considerable rubber afloat and prices became easier. On March 5 First latex and Smoked sheet ribbed, spot were quoted 77½ cents, the market being generally firm until later in the month when values became easier and prices declined. On March 27 First latex and Smoked sheet ribbed, spot were quoted 77½ cents. An unusual feature of the month has been the variation of prices in the three principal world markets. New York's highest figure was 87 cents, that of London was 80 cents and Singapore, 74 cents. This abnormal situation is undoubtedly due to the weak financial position and shipping difficulties surrounding the Eastern markets.

London imports for January were 6364 tons; Liverpool imports for the same period were 1215 tons. For December London imports were 5150 tons and for Liverpool 1771 tons. Reexports for January were as follows: London, 4473 tons; Liverpool 976 tons against London 2421 tons, and Liverpool 368 tons for December.

SINGAPORE.

At the auctions held March 2, 10, 16 and 22 the average prices obtained were as follows: First latex crêpe, 70.44 cents;

Smoked sheet, ribbed, 70.23 cents. The total amount sold was 1840 tons.

NEW YORK SPOT QUOTATIONS.

	April 1, 1916.	March 1, 1917.	March 29, 1917.
PLANTATION PARAS—			
First-latex crêpe	87	86½	82
Amber crêpe, light gristly	85½	83	78½
Amber crêpe, dark	82	78
Brown crêpe, thick clean	83½	80	77
Brown crêpe, thin clean, light mottled	82	78
Brown crêpe, thin clean	83½	80	77
Brown crêpe, thin specky	76	75
Brown crêpe, thin barkey	73	72
Brown crêpe, rolled	69	65
Smoked sheet, ribbed standard quality ..	86½	86½	82
Smoked sheet, plain standard quality	85	80½
Unsmoked sheet, standard quality	84	78½
Singapore scrap, No. 1	63	63
Singapore scrap, No. 2	60	61
Colombo scrap, No. 1	64	64
Colombo scrap, No. 2	62	62
BRAZILIAN PARAS—			
Upriver fine	73½	80	76½
Upriver medium	74	71½
Upriver coarse	57½	54	52½
Knapack Madeira	88	82
Upriver weak fine	68	65
Upriver caucho ball	38½	54½	53
Islands fine	69	75	72
Islands medium	69	66
Islands coarse	37	38	36
Islands weak fine	64	54
Caneta	39	46	38
Lower caucho ball	49	48
Peruvian fine	78	74
Tapajos fine	77	74
AFRICANS—			
Acraa flake	33	33
Niger flake	34	34
Benguela, extra seconds, 28%	41½
Benguela, No. 2, 32½%	39
Benguela, No. 3, 40%	33½
Congo prime, black upper	65	65
Congo prime, red upper	60	60
Kio Nuncz ball	67	67
Kio Nuncz sheets and strings	66	64
Conakry niggers	67	67
Massai sheets and strings	65	63
CENTRALS—			
Esmeralda sausage	51	50
Central scrap	50	49
Central scrap and strip	48	48
Central wet sheet	35	35
Guayule	50	50
MANICOBAS—			
Ceara scrap	33	35
Ceara negro heads	48	49
Manicoba special	37	38
Manicoba extra	35	35
Manicoba regular	33	32
Mangabeira thin sheet	38	..
Mangabeira thick sheet	36	..
HALATA—			
Balata block	68	68
Surinam sheet	87	95
EAST INDIAN—			
Assam crêpe	78	75
Assam onions	75	73
Penang block scrap	35	35
Pontianak pressed	17	25
Bandjermassin	12	20
Gutta percha, red Macassar	85	225

AFRICANS.

	POUNDS.
FEBRUARY 28.—By the <i>Honoreta</i> =Lisbon:	
Various	365,300
MARCH 9.—By the <i>Ruchambau</i> =Bordeaux:	
Various	51,000
MARCH 9.—By the <i>Goggo</i> =Lisbon:	
Various	128,000
MARCH 10.—By the <i>Abriatic</i> =Liverpool:	
Rubber Trading Co.	6,720
Various	201
MARCH 10.—By the <i>Marengo</i> =London:	
Aldens' Successors, Ltd.	112,560
Hagemeyer Trading Co.	22,418
MARCH 19.—By the <i>Saxonia</i> =London:	
Aldens' Successors, Ltd.	32,000

MANICOBAS.

FEBRUARY 28.—By the <i>Holbein</i> =Bahia:	
Rosshack Bros.	137,200
Various	126,900
MARCH 12.—By the <i>Spencer</i> =Rio de Janeiro:	
Various	400
MARCH 12.—By the <i>Spencer</i> =Bahia:	
Various	51,000
MARCH 12.—By the <i>Minas Geraes</i> =Bahia:	
Various	28,100
MARCH 12.—By the <i>Minas Geraes</i> =Pernambuco:	
Various	21,500

PLANTATIONS.

FEBRUARY 24.—By the <i>Eurymedon</i> =Penang:	
L. Littlejohn & Co.	472,300
Hood Rubber Co.	8,100
Henderson & Korn	171,800
J. T. Johnstone & Co.	316,000
Charles T. Wilson Co., Inc.	11,200
Rubber Trading Co., Ltd.	17,680
Goodyear Tire & Rubber Co.	7,900
Hagemeyer Trading Co.	8,960
Arnold & Zeiss	80,400
Wm. H. Stiles	33,600
Fred Stern & Co.	56,400
Robinson & Co.	137,500
W. R. Grace & Co.	41,000
Edward Maurer & Co.	31,900
East Asiatic Co.	157,500
Arthur Meyer & Co.	84,700
Mexican Crude Oil & Asphalt	
Products Co.	23,700
Robert Badenhop Co., Inc.	14,000
F. B. Ross & Co.	16,200
Goldman, Sachs & Co.	21,600
	1,837,140

FEBRUARY 24.—By the *Eurymedon*=Port Dick-

son:	
L. Littlejohn & Co.	27,000
Henderson & Korn	13,000
J. T. Johnstone & Co.	27,100
Charles T. Wilson Co., Inc.	4,000
Robinson & Co.	13,200
Fred Stern & Co.	1,400
East Asiatic Co.	11,700
Arthur Meyer & Co.	1,300
	98,700
FEBRUARY 26.—By the <i>Francisco</i> =Hull:	
Robert Badenhop Co., Inc.	15,100
FEBRUARY 28.—By the <i>Finland</i> =Liverpool:	
Goodyear Tire & Rubber Co.	8,900
MARCH 2.—By the <i>Radja</i> =Batavia:	
Hagemeyer Trading Co.	32,955
Rubber Trading Co.	96,320
The B. F. Goodrich Co.	106,300
J. T. Johnstone & Co.	192,000
Raw Products Co.	88,496
Meyer & Brown	139,800
General Rubber Co.	419,700
G. Amsinck & Co.	165,700
Robinson & Co.	1,200
W. R. Grace & Co.	1,700
E. Naumburg & Co.	19,400
F. E. Meltenburg & Co.	4,300
Rutger Bloeker	23,300
Eugen Boissevain & Co., Inc.	5,700
Joosten & Janssen	27,000
Various	526,400
	1,851,371

MARCH 5.—By the <i>Urania</i> =London:	
Aldens' Successors, Ltd.	227,000
J. T. Johnstone & Co.	900
Meyer & Brown	99,300
Arnold & Zeiss	115,600
R. F. Downing & Co.	1,600
Poeth & Co., Inc.	116,100
Various	24,300
	584,800

MARCH 5.—By the <i>Michigan</i> =London:	
The Goodyear Tire & Rubber Co.	578,400
Charles T. Wilson Co., Inc.	91,300
L. Littlejohn & Co.	211,900
Rubber Trading Co.	44,800
Hagemeyer Trading Co.	8,691
W. H. Stiles & Co.	32,800
Fred Stern & Co.	157,400
Various	27,900
	1,153,191

MARCH 7.—By the <i>Carmania</i> =Liverpool:	
Various	45,300

MARCH 8.—By the <i>Baltic</i> =Liverpool:	
Various	1,600

MARCH 9.—By the *Minnehaha*=London:

Rubber Trading Co.	71,680
Hagemeyer Trading Co.	22,366
L. Littlejohn & Co.	85,100
United States Rubber Co.	57,200
The Goodyear Tire & Rubber Co.	182,300
Robinson & Co.	32,400
Winter, Son & Co.	42,200
	493,246

MARCH 12.—By the *Keon Maru*=Calcutta:

Aldens' Successors, Ltd.	44,800
Various	204,900
	249,700

MARCH 12.—By the *Port Napier*=London:

Aldens' Successors, Ltd.	801,500
L. Littlejohn & Co.	153,200
United States Rubber Co.	110,400
Raw Products Co.	11,162
	1,076,262

MARCH 12.—By the *Mississippi*=London:

Raw Products Co.	18,062
United States Rubber Co.	89,300
L. Littlejohn & Co.	121,500
Goodyear Tire & Rubber Co.	39,900
Meyer & Brown	34,500
Fred Stern & Co.	56,100
Robinson & Co.	10,300
Various	18,700
	388,362

MARCH 12.—By the *St. George*=London:

Michelin Tire Co.	37,100
Hagemeyer Trading Co.	51,359
Rubber Trading Co.	33,600
L. Littlejohn & Co.	116,500
Raw Products Co.	22,279
United States Rubber Co.	120,200
J. T. Johnstone & Co.	141,700
Edward Maurer & Co.	77,000
Arnold & Zeiss	143,200
Meyer & Brown	92,800
Johnston & Co.	4,500
Robert Badenhop Co., Inc.	14,900
Various	215,400
	1,070,538

MARCH 19.—By the *Saxonia*=London:

Aldens' Successors, Ltd.	192,500
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MARCH 19.—By the *Pannonia*=London:

Aldens' Successors, Ltd.	33,500
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BALATA.

FEBRUARY 28.—By the *Allianca*=Cristobal:

J. S. Sembrada & Co.	2,900
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FEBRUARY 28.—By the *Allianca*=Panama:

Piza, Nephews & Co.	400
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FEBRUARY 28.—By the *Allianca*=Colon:

Gottard & Co.	4,800
Potberg, Ehling & Co.	2,900
Franklin Baker & Co.	2,900
C. Carboni	3,200
	13,800

MARCH 1.—By the *Cristobal*=Cristobal:

G. Amsinck & Co.	900
Gaston, Williams & Wigmore	7,300
Mecke & Co.	800
	8,000

MARCH 2.—By the *Carrillo*=Cartagena:

G. Amsinck & Co.	9,000
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MARCH 5.—By the *Maracaibo*=Curacao:

G. Amsinck & Co.	118,910
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MARCH 7.—By the *Colon*=Panama:

Fidante Bros & Co.	15,600
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MARCH 9.—By the *Maturra*=Ciudad Bolivar:

American Trading Co.	13,200
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MARCH 9.—By the *Maturra*=Demerara:

F. P. Watson	1,800
Various	7,300
	9,100

MARCH 9.—By the *Maturra*=Paramaribo:

G. Amsinck & Co.	1,800
Middleton & Co.	9,800
Various	1,300
	12,900

PONTIANAK.

FEBRUARY 24.—By the *Eurymedon*=Penang:

L. Littlejohn & Co.	328,200
Askell & Douglas	1,500
	329,700

MARCH 2.—By the *Radja*=Batavia:

Eugen Boissevain & Co., Inc.	500
Rowe, White & Co.	52,700
Various	35,000
	88,200

GUTTA SIAR.

FEBRUARY 24.—By the *Eurymedon*=Penang:

L. Littlejohn & Co.	55,000
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RUBBER SCRAP.

FEBRUARY 26.—By the *Ticives*=Santiago de

Cuba:	
Neuss, Hesslein & Co.	3,800

FEBRUARY 27.—By the *Havana*=Havana:

Lola, Yglesias & Co.	5,200
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MARCH 5.—By the *Esperanza*=Havana:

Various	400
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MARCH 5.—By the *Melford Hall*=Manchester:

H. Muehlstein & Co.	13,400
J. Mason	4,000
W. H. Webb	23,200
Various	26,400
	67,000

MARCH 6.—By the *Nigeria*=Havre:

The Loewenthal Co.	103,200
H. Muehlstein & Co.	28,600
Leopold Lazarus Co.	6,400
	138,200

MARCH 7.—By the *Saratoga*=Havana:

Yglesias & Co.	8,200
Gontard & Co.	2,400
	10,600

MARCH 7.—By the *Colon*=Cristobal:

G. Amsinck & Co.	200
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MARCH 9.—By the *Maturra*=Paramaribo:

Poos & Co.	100
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MARCH 9.—By the *Minnehaha*=London:

H. Muehlstein & Co.	45,700
Various	18,800
	64,500

MARCH 12.—By the *Port Napier*=London:

H. Muehlstein & Co.	73,900
Various	252,600
	326,500

MARCH 12.—By the *St. George*=London:

H. Muehlstein & Co.	22,800
Various	12,300
	35,100

MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.	1,400
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CRUDE RUBBER ARRIVALS AT SEATTLE.

[Figured 135 pounds net to the case.]

PLANTATION.

TO SEATTLE.

MARCH 1.—By the *Sado Maru*=Yokohama:

Goodyear Tire & Rubber Co.	3,645
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J. T. Johnstone & Co.

Charles T. Wilson Co., Inc.	1,620
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W. R. Grace & Co.

	10,395
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MARCH 1.—By the *Irion*=Hongkong:

The Goodyear Tire & Rubber Co.	32,535
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Charles T. Wilson Co., Inc.

Arnold & Zeiss	7,600
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W. R. Grace & Co.

	1,755
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MARCH 17.—By the *Yokohama Maru*=Yokohama:

L. Littlejohn & Co.	8,910
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	118,800
--	---------

L. Littlejohn & Co.

	199,530
--	---------

TO NEW YORK.

MARCH 1.—By the *Sado Maru*=Yokohama:

L. Littlejohn & Co. and Wm.	23,220
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Brandt's Sons & Co.

Robinson & Co.	11,610
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MARCH 1.—By the *Irion*=Hongkong:

L. Littlejohn & Co.	434,835
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Rubber Trading Co.

United States Rubber Co.	22,005
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Henderson & Korn

	270
--	-----

Meyer & Brown

	50,490
--	--------

Frank B. Ross & Co.

	11,340
--	--------

W. R. Grace & Co.

	9,315
--	-------

Robinson & Co.

	13,365
--	--------

East Asiatic Co.

	10,125
--	--------

Arnold & Zeiss

	176,040
--	---------

W. H. Stiles

	164,160
--	---------

Edward Maurer & Co.

	262,035
--	---------

MARCH 4.—By the *Canada Maru*=Yokohama:

L. Littlejohn & Co.	1,171,800
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Henderson & Korn

	6,885
--	-------

Fred Stern & Co.

	78,030
--	--------

Robinson & Co.

	3,645
--	-------

MARCH 17.—By the *Yokohama Maru*=Yokohama:

Goodyear Tire & Rubber Co.	6,615
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	95,175
--	--------

TO AKRON.

MARCH 1.—By the *Sado Maru*=Yokohama:

Goodyear Tire & Rubber Co.	20,250
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J. T. Johnstone & Co.

	43,200
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MARCH 1.—By the *Irion*=Hongkong:

Goodyear Tire & Rubber Co.	585,495
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Firestone Tire & Rubber Co.

POUNDS. VALUE.
PORT OF CLEVELAND—FEBRUARY, 1917.

IMPORTS:		
India rubber	84,965	\$44,656
Rubber scrap	399	27
Totals	85,364	\$44,683

PORT OF BOSTON—JANUARY, 1917.

IMPORTS:		
India rubber	146,297	\$57,623
Gutta jelutong (Pontianak)	498,374	21,693
Rubber scrap	164,684	6,708
Manufactures of india rubber	778	778
Totals	809,355	\$86,802

EXPORTS:		
India rubber boots....pairs	48,565	\$101,002
India rubber shoes....pairs	103,252	60,453
Automobile tires	729	1,172
Beltine, hose, etc.		9,963
All other manufactures of india rubber		
Total		\$173,319

PORT OF BOSTON—FEBRUARY, 1917.

IMPORTS:		
India rubber	31,276	\$15,970
Gutta jelutong (Pontianak)	183,067	8,958
Rubber scrap	151,381	4,768
Manufactures of india rubber	1,556	1,556
Totals	365,724	\$31,252

EXPORTS:		
Rubber scrap	20,837	\$2,188
India rubber boots....pairs	31,285	66,593
India rubber shoes....pairs	123,659	65,688
Automobile tires	1,076	80
Other rubber tires		158
Beltine, hose, etc.		6,876
All other manufactures of india rubber		
Total		\$142,659

DISTRICT OF MICHIGAN—JANUARY, 1917.

IMPORTS:		
Rubber scrap	31,615	\$3,498
Manufactures of india rubber		70
Totals	31,615	\$3,568

EXPORTS:		
Rubber scrap	108,421	\$9,006
India rubber boots....pairs	6,392	15,984
India rubber shoes....pairs	14	18
Automobile tires	5,255	28
Other rubber tires		1,406
Beltine, hose, etc.		4,782
All other manufactures of india rubber		
Total		\$36,479

DISTRICT OF MICHIGAN—FEBRUARY, 1917.

IMPORTS:		
Manufactures of india rubber		\$5,821
EXPORTS:		
India rubber boots....pairs	1,205	\$3,830
India rubber shoes....pairs	32	56
Automobile tires	27,689	25
Other rubber tires		679
Beltine, hose, etc.		4,524
All other manufactures of india rubber		
Total		\$36,803

PORT OF NEW YORK—FEBRUARY, 1917.

IMPORTS:		
India rubber	15,462,859	\$8,293,212
Balata	223,484	103,307
Gutta percha	28,365	3,489
Gutta jelutong (Pontianak)	1,336,535	57,373
Manufactures of india rubber		44,579
Totals	17,051,243	\$8,501,960

EXPORTS:		
Balata	135,238	\$74,309
Rubber scrap, imported....	1,130,259	82,640
Rubber scrap, exported....lbs.	210,329	29,313
Reclaimed rubber	6,749	1,115
India rubber boots....pairs	1,959	4,864
India rubber shoes....pairs	94,092	51,500
Automobile tires	482,170	123,363
Other rubber tires		176,930
Beltine, hose, etc.		464,369
All other manufactures of india rubber		
Total		\$1,490,573

PORT OF NEW ORLEANS—JANUARY, 1917.

IMPORTS:		
India rubber	50,008	\$19,818

PORT OF NEW ORLEANS—FEBRUARY, 1917.

IMPORTS:		
India rubber	85,650	\$37,499

POUNDS. VALUE.
PORT OF SAN FRANCISCO—JANUARY, 1917.

IMPORTS:		
India rubber	1,862,768	\$1,106,371
Manufactures of india rubber		490
Totals	1,862,768	\$1,106,861

EXPORTS:		
Reclaimed rubber		\$10,163
India rubber boots....pairs	300	1,860
India rubber shoes....pairs	36,897	24,969
Automobile tires		205,058
Other rubber tires		31,507
Beltine, hose, etc.		27,051
All other manufactures of india rubber		25,226
Total	37,197	\$325,834

PORT OF PHILADELPHIA—JANUARY, 1917.

EXPORTS:		
Automobile tires		\$100,919
All other manufactures of india rubber		641
Total		\$101,560

PORT OF PHILADELPHIA—FEBRUARY, 1917.

EXPORTS:		
Automobile tires		\$68,874
All other manufactures of india rubber		65
Total		\$68,939

PORT OF SAN FRANCISCO—FEBRUARY, 1917.

IMPORTS:		
India rubber	2,319,903	\$1,373,883
Manufactures of india rubber		4
Totals	2,319,903	\$1,373,887

EXPORTS:		
India rubber boots....pairs	1,060	\$6,622
India rubber shoes....pairs	1,750	1,205
Automobile tires		98,480
Other rubber tires		11,760
Beltine, hose, etc.		10,403
All other manufactures of india rubber		6,134
Totals	2,810	\$134,613

PORT OF SEATTLE AND TACOMA—JANUARY, 1917.

IMPORTS:		
India rubber	4,113,109	\$2,103,095
Manufactures of india rubber		17
Totals	4,113,109	\$2,103,112

EXPORTS:		
India rubber boots....pairs	322	\$1,265
India rubber shoes....pairs	676	934
Automobile tires		3,200
Other rubber tires		387
Beltine, hose, etc.		9,741
All other manufactures of india rubber		12,008
Totals	998	\$27,535

PORT OF SEATTLE AND TACOMA—FEBRUARY, 1917.

IMPORTS:		
India rubber	1,261,530	\$807,442
Manufactures of india rubber		25
Totals	1,261,530	\$807,467

EXPORTS:		
India rubber boots....pairs	511	\$1,668
India rubber shoes....pairs	1,300	1,373
Automobile tires		41,258
Other rubber tires		809
Beltine, hose, etc.		6,306
All other manufactures of india rubber		3,364
Totals	1,811	\$54,868

RUBBER STATISTICS *FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	January, 1917.	
	Pounds.	Value.
Unmanufactured—free:		
India rubber:		
From—		
France	99,381	\$54,329
Portugal	181,689	71,962
United Kingdom	7,456,359	4,723,797
Central American States and British Honduras	148,319	69,423
Mexico	213,188	70,096
Brazil	4,924,023	2,356,592
Other South America	1,424,207	708,275
East Indies	21,647,115	11,291,612
Other countries	7,506	3,224
Totals	36,101,787	\$19,349,310

Balata	310,677	150,864
Guayule gum	52,462	11,837
Gutta jelutong	3,419,835	149,168
Gutta percha	378,241	26,521

Totals	40,262,942	\$19,687,700
Rubber scrap	1,951,049	141,622
Totals, unmanufactured	42,213,991	\$19,829,322
Chicle	497,411	242,263

Manufactured—dutiable:		
Gutta percha		6,014
India rubber		31,636
Totals, manufactured		\$37,650

EXPORTS OF DOMESTIC MERCHANDISE.

	January, 1917.	
	Pounds.	Value.
Manufactured—		
Automobile tires:		
To—		
France		\$58,157
Russia in Europe		16,134
England		456,001
Canada		108,226
Mexico		18,645
Cuba		64,563
Australia		41,190
New Zealand		60,493
Philippine Islands		36,888
Other countries		468,522
Total		\$1,328,819

All other tires		726,305
Beltine, hose and packing		292,650
Rubber boots		172,602
Rubber shoes		307,883
Scrap and old rubber		22,285
Reclaimed rubber		69,257
Other rubber manufactures		740,301
Totals, manufactured		\$3,519,911
Fountain pens	15,676	\$9,900

EXPORTS OF FOREIGN MERCHANDISE.

	January, 1917.	
	Pounds.	Value.
Unmanufactured—		
Balata	118,547	\$67,767
Guayule gum		
Gutta jelutong		
Gutta percha	40	48
India rubber	2,269,259	1,456,428
Rubber scrap and refuse		
Totals, unmanufactured	2,387,846	\$1,524,243
Chicle	5,468	\$1,912

	January, 1917.	
	Pounds.	Value.
Manufactured—		
Gutta percha		\$301
India rubber		38
Total, manufactured		\$339

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	January, 1917.	
	Pounds.	Value.
Manufactured—		
To—		
Alaska:		
Beltine, hose and packing		\$7,823
Boots and shoes....pairs	3,456	8,283
Other rubber goods		1,172
Total		\$17,278
To—		
Hawaii:		
Beltine, hose and packing		\$10,495
Automobile tires		119,798
Other tires		11,934
Other rubber goods		16,307
Total		\$157,634
To—		
Philippine Islands:		
Beltine, hose and packing		\$6,927
Boots and shoes....pairs	56,297	37,377
Tires		37,436
Other rubber goods		9,366
Total		\$91,106
To—		
Porto Rico:		
Beltine, hose and packing		\$4,411
Automobile tires		49,810
Other tires		274
Other rubber goods		5,881
Total		\$60,376

* Dutiable beginning July 1, 1916.

† Not separately stated prior to January 1, 1916.

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

The following list of rubber arrivals at the Port of New York is not complete, due to orders from the Treasury Department prohibiting access to the records.

Week Ending—	IMPORTS.									
	India Rubber.		Scrap for Re-manufacture.		Balata.		Chicle.		Gutta Jelutong.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
February 23, 1917.....	5,009,897	\$2,959*	577,080	\$41,314	38,242	\$15,843	31	\$70	.....	.....
March 2, 1917.....	9,284,818	4,349*	562,139	40,278	60,566	26,301	54,583	27,495	146,207	\$6,845

* Manufactures of India Rubber.

EXPORTS.

FIGURES ISSUED FROM FEBRUARY 24 TO MARCH 12, 1917.*

EXPORTED TO—	Belting, Hose and Packing.	Footwear.		Tires.		Insulated Wire and Cables.	Other mnf. of India Rubber.	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.	India Rubber.
		Boots.	Shoes.	Auto.	Other.						
NORTH AMERICA:											
Bermuda.....	\$38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
British Honduras.....	.....	.....	8967	.....	.....	.....	.....	.....	.....	.....	.....
Canada.....	.....	.....	.....	.....	.....	.....	66	.....	.....	.....	.....
Central American States—											
Costa Rica.....	1,217	.....	134	1,356	160	.....	533	\$21	88	.....	.....
Guatemala.....	136	.....	.....	744	.....	.....	715	.....	287	.....	.....
Honduras.....	249	.....	.....	223	84	.....	354	.....	200	.....	.....
Nicaragua.....	.....	.....	.....	4,539	432	.....	3,297	.....	.....	.....	.....
Panama.....	2,882	.....	138	2,959	39	.....	1,049	3	2,331	.....	.....
Salvador.....	265	.....	.....	3,959	2,761	.....	254	.....	167	.....	.....
Mexico.....	4,447	.....	476	3,682	3,959	3,410	2,793	.....	144	.....	.....
Miquelon.....	12	.....	235	.....	.....	.....	570	.....	.....	.....	.....
Newfoundland.....	.....	.....	8,124	1,441	180	97	3,302	4	32	.....	.....
West Indies—											
British.....	107	.....	19	554	669	167	127	.....	8	.....	.....
Barbados.....	36	.....	.....	15	6	88	151	.....	.....	.....	.....
Jamaica.....	135	.....	600	2,397	415	.....	1,041	.....	4	.....	.....
Trinidad and Tobago.....	88	.....	892	4,054	246	1,407	374	162	.....	.....	.....
Other British.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....
Cuba.....	5,413	\$71	1,477	14,978	1,874	16,961	16,022	.....	921	.....	.....
Danish.....	.....	.....	.....	214	.....	.....	39	.....	.....	.....	.....
Dutch.....	24	.....	.....	85	64	.....	13	.....	.....	.....	.....
Haiti.....	60	.....	.....	323	508	5	186	30	.....	.....	.....
Santo Domingo.....	273	.....	3	5,004	291	63	300	18	568	.....	.....
Totals, North America.....	\$15,382	\$71	\$13,065	\$42,683	\$8,947	\$28,271	\$28,337	\$246	\$4,752	.....	.....
EUROPE:											
Denmark.....	.....	\$996	\$379	.....	.....	.....	\$548	.....	.....	.....	.....
France.....	\$2,500	242	11,793	\$10,281	\$18,218	\$115,948	66,647	\$1,958	\$1,500	\$191	.....
Iceland.....	.....	.....	.....	61	.....	.....	.....	.....	.....	.....	.....
Italy.....	.....	.....	.....	.....	863	366	15,520	.....	.....	.....	.....
Norway.....	892	.....	.....	.....	.....	56,168	6,837	.....	.....	.....	.....
Portugal.....	.....	.....	.....	3,635	300	.....	335	.....	.....	.....	.....
Russia in Europe.....	.....	.....	.....	43,680	.....	4,910	4,150	.....	.....	.....	.....
Spain.....	.....	.....	.....	16,860	.....	65,344	215	96	.....	.....	.....
Sweden.....	.....	.....	.....	.....	.....	745	.....	.....	.....	.....	.....
Switzerland.....	.....	.....	1,226	.....	.....	.....	2,662	.....	1,000	.....	.....
United Kingdom—											
England.....	16,313	.....	5,857	54,272	48,716	9,691	86,650	172	92,004	.....	.....
Scotland.....	8,342	.....	2,039	.....	.....	.....	.....	.....	.....	.....	.....
Totals, Europe.....	\$28,047	\$1,238	\$21,294	\$127,789	\$68,097	\$251,172	\$183,564	\$2,226	\$94,504	\$191	\$761
SOUTH AMERICA:											
Argentina.....	\$5,084	.....	\$138	\$20,360	\$57	\$367	\$10,277	\$2,433	.....	.....	.....
Bolivia.....	1,373	.....	.....	615	1,113	.....	80	.....	.....	.....	.....
Brazil.....	7,489	\$30	1,213	11,700	302	11,032	12,330	.....	.....	.....	.....
Chile.....	2,981	.....	1,016	25,490	330	12,115	9,308	18	838	.....	.....
Colombia.....	543	.....	174	2,415	.....	1,924	2,881	.....	62	.....	.....
Ecuador.....	56	.....	.....	380	39	385	977	.....	395	.....	.....
Guiana—British.....	28	.....	.....	1,534	.....	112	126	.....	.....	.....	.....
Dutch.....	.....	.....	.....	220	132	.....	117	.....	.....	.....	.....
French.....	.....	.....	.....	.....	.....	.....	41	8	.....	.....	.....
Peru.....	2,743	2,624	.....	2,418	2,902	4,089	2,337	.....	748	.....	.....
Uruguay.....	1,436	151	.....	11,675	.....	1,250	1,006	.....	.....	.....	.....
Venezuela.....	1,267	.....	.....	7,744	6,570	791	3,180	.....	75	.....	.....
Totals, South America.....	\$23,220	\$2,805	\$2,541	\$84,551	\$11,645	\$32,065	\$42,660	\$2,524	\$1,318	.....	.....
ASIA:											
China.....	.....	.....	.....	.....	.....	\$15,861	\$49	.....	.....	.....	.....
British East Indies.....	\$114	.....	.....	.....	\$1,477	.....	.....	.....	.....	.....	.....
British India.....	673	.....	896	\$731	.....	988	523	\$344	\$22	.....	.....
Straits Settlements.....	.....	.....	.....	298	.....	.....	44	.....	.....	.....	.....
Hong Kong.....	.....	.....	.....	.....	.....	.....	22	.....	.....	.....	.....
Japan.....	.....	.....	.....	75	.....	.....	2,680	.....	.....	.....	.....
Russia in Asia.....	.....	.....	.....	.....	.....	.....	12,300	.....	.....	.....	.....
Totals, Asia.....	\$787	\$228	\$111	\$1,104	\$1,477	\$16,849	\$15,618	\$344	\$22	.....	.....
OCEANIA:											
British—											
Australia and Tasmania.....	\$5,379	\$1,685	\$4,416	\$446	85	\$5,824	\$4,886	.....	\$979	.....	.....
New Zealand.....	298	.....	867	11,095	.....	357	2,726	.....	81	.....	.....
Philippine Islands.....	342	.....	.....	169	.....	.....	4,622	.....	1,600	.....	.....
Persia.....	1,875	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals, Oceania.....	\$7,894	\$1,685	\$5,283	\$11,710	85	\$6,181	\$12,234	.....	\$2,660	.....	.....
AFRICA:											
British Africa—											
West.....	\$304	.....	.....	.....	.....	.....	\$367	.....	.....	.....	.....
South.....	5,620	\$274	.....	\$32,574	.....	\$149	.....	\$4,350	.....	\$1,199	.....
French Africa.....	.....	.....	.....	125	.....	.....	.....	.....	.....	.....	.....
Portuguese Africa.....	2,685	.....	.....	.....	.....	.....	.....	48	.....	.....	.....
Liberia.....	19	.....	.....	92	.....	.....	.....	.....	.....	.....	.....
Totals, Africa.....	\$8,528	\$274	.....	\$32,791	.....	\$149	\$367	\$4,398	.....	\$1,199	.....

* In addition to the above the following items were exported during the same period, To England—Balata, \$47,981.

MONTHLY IMPORTATIONS OF RUBBER TO THE UNITED STATES FOR THE LAST SIX YEARS (In Tons).

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
Plantation Ceylon—													
1911.....	339	417	616	518	688	489	460	470	614	697	551	697	6,556
1912.....	866	976	986	1,286	1,750	676	849	923	1,153	1,568	1,735	2,235	15,003
1913.....	1,611	1,558	1,978	1,783	1,801	1,700	1,728	1,979	2,534	2,214	2,373	2,708	23,967
1914.....	2,165	2,782	3,329	4,407	4,105	2,493	2,204	2,032	3,989	3,360	2,327	2,133	35,326
1915.....	410	3,865	5,205	7,166	4,443	6,319	5,260	5,311	5,330	6,665	3,750	7,361	61,085
1916.....	6,825	6,272	7,287	6,625	8,421	9,103	5,418	5,326	6,150	6,948	7,341	9,571	85,287
Fine Para—													
1911.....	896	701	638	382	498	1,105	795	754	925	1,498	1,376	1,250	10,818
1912.....	1,728	1,657	1,304	1,240	676	767	701	844	866	1,056	1,105	1,241	13,185
1913.....	1,334	1,380	899	749	499	665	452	566	757	877	1,120	774	10,072
1914.....	907	623	1,282	784	862	525	469	610	963	1,146	1,100	836	10,107
1915.....	1,521	638	1,799	418	807	393	624	458	1,243	781	1,372	1,604	11,658
1916.....	813	1,252	1,206	1,274	870	1,230	667	293	1,465	448	1,853	1,227	12,598
Coarse Para—													
1911.....	459	469	384	326	413	436	370	421	432	421	499	444	5,074
1912.....	657	641	756	516	438	537	375	469	427	356	469	415	6,056
1913.....	606	665	436	428	406	403	437	404	301	270	468	413	5,257
1914.....	492	341	754	432	599	304	420	182	364	362	418	485	5,153
1915.....	432	452	1,047	320	598	340	488	203	430	421	725	562	6,018
1916.....	428	555	446	761	558	438	334	78	465	84	649	553	5,349
Caucho—													
1911.....	52	241	120	183	259	143	236	193	91	115	104	88	1,825
1912.....	85	333	15	391	359	306	130	213	183	213	221	327	2,776
1913.....	226	250	185	280	383	491	398	231	258	140	223	87	3,152
1914.....	188	107	625	858	744	292	365	185	337	148	188	169	4,206
1915.....	137	223	1,111	246	356	463	449	275	227	227	329	219	4,341
1916.....	302	411	363	687	732	555	272	281	221	20	276	323	4,443
Other Grades—													
1911.....	642	615	1,398	889	895	682	750	843	1,176	1,238	608	1,079	10,815
1912.....	1,390	1,373	1,786	1,864	900	697	645	921	1,019	803	645	988	13,031
1913.....	1,116	823	342	558	635	428	454	371	328	397	292	532	6,276
1914.....	242	675	515	603	644	281	211	215	415	336	366	581	5,084
1915.....	776	254	506	780	442	642	671	597	633	585	451	731	7,068
1916.....	737	1,018	630	596	481	690	225	290	574	343	683	594	6,831

HIGHEST AND LOWEST RATES PER POUND IN UNITED STATES CURRENCY.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
First Latex Crepe—												
1911.....	118@130	126@128	128@137	120@132	116@121	116@121	112@123	129@135	125@135	112@123	110@116	115@120
1912.....	103@111	96@103	88@96	76@88	78@84	70@77	66@70	66@70	52@64	50@52	52@60	53@55
1913.....	55@61	58@64	58@65	64@72	57@65	54@57	54@57	60@105	52@56	54@62	58@65	73@87
1914.....	59@64	57@63	59@60	59@60	59@61	60@63	62@63	59@61	57@58	61@63	63@78	76@99
1915.....	70@103	72@90	83@88	74@82	61@74	56@62	52@57	53@56	54@60	56@60	60@69	68@82
Upriper Fine—												
1911.....	112@128	125@166	136@167	115@141	95@129	95@104	99@116	109@116	111@119	100@111	100@104	102@108
1912.....	103@112	108@110	110@122	110@118	108@111	107@112	112@119	116@121	111@121	103@111	101@108	106@111
1913.....	102@110	96@102	88@96	77@88	82@91	86@89	83@92	83@93	77@88	72@78	73@78	71@74
1914.....	73@77	73@78	73@74	73@74	69@74	68@69	68@73	75@115	64@78	64@66	63@71	70@76
1915.....	61@75	57@61	58@60	57@60	59@61	61@63	59@63	56@59	55@57	55@57	57@76	68@87
1916.....	77@99	73@80	74@78	72@74	67@72	62@68	65@68	65@68	69@74	71@80	79@83	78@81
Upriper Coarse—												
1911.....	87@94	93@117	108@118	85@105	79@93	79@84	81@96	94@98	95@98	88@95	88@90	88@92
1912.....	90@94	92@94	94@99	92@96	87@92	84@91	89@96	87@96	85@95	80@86	79@84	81@82
1913.....	76@84	72@78	63@72	52@66	55@61	54@62	50@56	50@53	48@52	46@49	44@49	44@47
1914.....	44@47	44@47	43@46	43@47	41@46	38@42	38@42	43@49	43@55	43@47	46@53	51@60
1915.....	45@58	44@48	45@47	46@48	45@46	45@47	44@47	42@44	41@43	42@45	44@62	57@72
1916.....	60@76	52@60	56@59	55@57	50@54	42@50	41@42	39@40	41@44	42@46	45@47	47@56

TOTAL IMPORTS INTO THE UNITED STATES.

STOCKS IN THE UNITED STATES AND EUROPE (In Tons).

TOTAL EXPORTS FROM PARA.										Stocks in the United States.										Total Stock, All Grades, Europe.
(In Tons).																				

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to December 31, 1915 and 1916. Compiled by the Ceylon Chamber of Commerce.)

To	1915.	1916.
United Kingdom	25,183,748	23,812,305
France	698,992	1,802,217
Russia	332,200	293,674
Victoria	908,697	571,236
New South Wales	56,000	225,799
United States	18,607,691	27,249,589
Canada and Newfoundland	392,495	6,720
India	1,530	1,741
Straits	119,933	43,680
Japan	264,501	344,080
Totals	46,566,187	54,698,729

The figures for 1915 and 1916 are for Ceylon rubber only.

Total Export from January 1 to December 31, 1916.....	pounds 54,698,729
Total Export from January 1 to December 31, 1915.....	46,566,187
Total Export from January 1 to December 31, 1914.....	35,318,269
Total Export from January 1 to December 31, 1913.....	25,433,551
Total Export from January 1 to December 31, 1912.....	15,001,675
Total Export from January 1 to December 31, 1911.....	7,154,658
Total Export from January 1 to December 31, 1910.....	3,586,854
Total Export from January 1 to December 31, 1909.....	1,492,580
Total Export from January 1 to December 31, 1908.....	556,080

(From January 1 to February 5, 1916 and 1917.)

To	1916.	1917.
United Kingdom	1,539,410	2,740,137
France	539,620	33,600
Italy	18,695	44,821
Russia	22,416	5,600
Victoria	3,290,537	1,584,802
New South Wales	40,320	2,240
Canada and Newfoundland	2,240	
Japan	4,891,058	5,010,840

(Same period 1915, 2,612,596 pounds; same period 1914, 2,510,543.)
The export figures of rubber, given in the above table for 1914, include the imports reexported. (These amount to 308,284 pounds from the Straits Settlements and 119,315 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

EXPORTS OF RAW RUBBER FROM PENANG.

January, 1917.

To—	Para Rubber.	India Rubber.	Borneo Rubber.
North America—			
United States—			
New York	5,766		
Akron	4,503		
Seattle	789		
Canada (Vancouver)	353		
Total	11,411		
Europe—			
United Kingdom—			
England—			
London	20,167	789	
Liverpool	897		
Totals	21,064	789	

RUBBER EXPORTS FROM JAVA.

December. Twelve Months-Ending December.

PLANTATION, TO—	1915.	1916.	1915.	1916.
Holland			45,370	342,720
Ficus				
Hevea	6,720	103,040	2,885,120	2,240
Hevea (to order)				15,792
Ceara				9,031
Castilloa				
Totals	6,720	103,040	2,957,553	342,720
Great Britain			64,010	39,301
Ficus	3,282			
Hevea	322,560	636,160	4,542,720	7,244,160
Ceara	8,474	1,976	37,149	60,425
Castilloa	19,006	4,149	110,972	60,089
Totals	352,322	642,285	4,754,851	7,403,975
United States			33,031	
Ficus				
Hevea	806,400	2,775,360	7,472,640	18,074,560
Ceara			12,852	14,542
Castilloa		6,743		24,279
Totals	806,400	2,782,103	7,485,492	18,146,412
Singapore			42,365	
Ficus	847	662	21,113	
Hevea	257,600	347,200	1,010,240	4,482,240
Ceara	2,168	18,089	12,417	73,986
Castilloa		1,320		7,139
Totals	260,555	367,271	1,043,770	4,605,730
Japan			69,440	
Hevea	13,440	15,680	264,320	
Australia			317	
Other countries			8,065	
Ficus	5,863	15,349		32,380
Hevea	47,040	11,200	203,840	613,760
Ceara			282	
Totals	52,903	26,549	212,187	646,140
Grand Totals	1,492,340	3,036,928	16,718,490	31,214,417

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

January, 1917.

From—	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham	1,775,466	47,400			
Teluk Anson	1,026,400				
Penang	566,296	4,400			
Muar	483,333				
Malacca	271,066	913,865			
Port Dickson	199,100				
Kelantan	100,000	23,866			
Kuantan	42,533			133	
Rengat	23,166				
S. Pandjang	6,666				
Mersing	2,800				
Falung	1,200				
Tringganu	953				
Totals	4,498,959	989,531		133	
Borneo—					
Sarawak	151,866	9,200	133	4,800	444,000
Jessellton	98,876	125,466			
Pontianak	86,133	4,500	3,333	3,600	64,000
Bandjermassin	58,000	27,066	5,733	89,333	118,266
Lahur	55,200	10,800		666	97,466
Sembas	54,933			5,200	22,800
Sibu	45,733		2,000	17,466	145,333
Sandakan	16,800	23,600	266		
Passir	16,800				
Singakawang	5,066				
Kudat	4,400		9,600	9,733	
Kampit	3,333	26,666			
Sampit	1,200		1,333	1,333	189,333
Totals	598,340	237,298	22,531	132,264	1,081,198
Sumatra—					
Dambi	270,800			2,133	
Belu	67,500	886,533			
Indragiri	28,266	13,866			
Palembang	22,133				6,133
Sink	7,866	9,066			
Muntok	1,600				
Pengkalis	1,066				
Asahan		141,200			
Belawan		72,800			
Totals	399,231	1,123,465		2,133	6,133
Java—					
Batavia	54,266				
Sourabaya	52,266				
Samarang	24,533				
Totals	131,065				
Siam—					
Bangkok	800			2,000	
Patani	533				
Totals	1,333			2,000	
Burma—					
Rangoon	86,800				
Mergui	7,733				
Totals	94,533				
Other ports	290,000	355,466	9,333	13,066	366,266
Grand Totals	6,013,461	82,695,760	31,864	149,596	1,453,597

EXPORTS.

January, 1917.

To—	Para Rubber.	Para Rubber shipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
North America—					
United States—					
Akron	1,992,833	26,933			
New York	1,507,066	32,333		44,800	
Seattle	134,400	19,333			
Boston	112,400				
San Francisco	49,733				
Canada—					
Vancouver	18,000	22,400			
Ontario (Toronto)	4,433	2,266			
Totals	3,818,865	103,465		44,800	
Europe—					
United Kingdom—					
England—					
London	1,366,000	1,626,266		185,600	49,333
Liverpool	244,133	376,000		22,533	59,200
Russia (Vladivostok)	632,933				
France (Marseilles)	157,200		36,266		
Italy (Genoa)	40,933				
Totals	2,441,199	2,002,266	36,266	208,133	108,533
Grand Totals	6,260,064	2,105,731	36,266	252,933	108,533

STRAITS SETTLEMENTS RUBBER-EXPORTS.

An official cablegram from the Colonial Secretary, Singapore, gives the export of plantation rubber from Straits Settlements ports in the month of January as 3,562 tons (of which 669 tons were transshipments), against 3,219 tons in December and 4,443 tons in the corresponding month last year.

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	December, 1916.	
	Pounds.	Value.
UNMANUFACTURED—free:		
Rubber and gutta percha, crude caoutchouc or india rubber:		
From—		
Great Britain	247,538	\$146,220
United States	382,768	234,808
Other countries	15,862	9,174
Totals	646,168	\$380,202
Rubber, recovered:		
From—		
Great Britain	24,352	\$6,162
United States	244,436	33,170
Totals	268,988	\$39,332
Hard rubber, in sheets and rods:		
From—		
United States	19,505	\$13,219
Rubber substitute:		
From—		
United States	71,075	\$7,006
Rubber, powdered, and rubber or gutta percha waste:		
From—		
Great Britain	21,156	\$751
United States	102,746	11,069
Other countries	11,727	900
Totals	135,629	\$12,720
Rubber thread, not covered:		
From—		
United States	5,104	\$7,505
Chicle, crude:		
From—		
United States	79,707	\$26,100
British Honduras	127,501	44,683
Mexico	251,678	86,746
Totals	458,886	\$157,529
MANUFACTURED—dutiable:		
	General Tariff. Value.	Preferential Tariff. Value.
Boots and shoes:		
From—		
United Kingdom		\$281
United States	\$16,044	
Totals	\$16,044	\$281
Belting:		
From—		
Great Britain		\$35
United States	\$6,683	
Totals	\$6,683	\$35
Waterproof clothing:		
From—		
Great Britain		\$25,526
United States	\$24,357	
Other countries	42	
Totals	\$24,399	\$25,526
Hose, lined with rubber:		
From—		
Great Britain		\$110
United States	\$4,478	
Totals	\$4,478	\$110
Mats and matting:		
From—		
United States	\$471	
Packing:		
From—		
United States	\$7,711	
Tires of rubber for all vehicles:		
From—		
Great Britain	\$10	\$3,061
United States	36,895	
Totals	\$36,905	\$3,061

Rubber cement and all other manufactures of india rubber and gutta percha, N.O.P.:

December, 1916.	
Pounds.	Value.
From—	
Great Britain	\$480
United States	\$1,780
Other countries	540
Totals	\$52,800

Hard rubber in tubes:	
From—	
United States	\$104
Webbing—over one inch wide:	
From—	
Great Britain	\$964
United States	\$22,075
Totals	\$22,075

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

December, 1916.	
Produce of Canada. Value.	Reexports of Foreign Goods. Value.
MANUFACTURED—	
Belting:	
To—	
Newfoundland	\$80
Hose:	
To—	
Great Britain	\$1,963
United States	15
Newfoundland	164
Other countries	1,397
Total	\$3,539

Boots and shoes:	
To—	
Great Britain	\$71,956
United States	25
Newfoundland	13,545
New Zealand	831
Other countries	2,095
Total	\$88,452

Tires:	
To—	
Great Britain	\$104,150
United States	11,531
Other countries	2,761
Totals	\$118,442
Waste:	
To—	
United States	\$23,466
All other, N. O. P.:	
To—	
Great Britain	\$5,979
United States	1,347
Newfoundland	342
New Zealand	603
Other countries	1,447
Totals	\$9,718

Gum chicle:	
To—	
Great Britain	\$6,000
United States	210,923
Total	\$216,923

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Ten Months Ending October, 1916.	
Pounds.	Lira.
UNMANUFACTURED—	
India rubber and gutta percha—raw and reclaimed:	
From—	
Great Britain	3,341,140
Straits Settlements	1,165,560
African French Colony	16,280
Belgian Congo	219,120
Brazil	3,899,940
Other countries	1,436,160
Totals	10,078,200

Ten Months Ending October, 1916.	
Pounds.	Lira.
Rubber scrap	5,635,740
MANUFACTURED—	
India rubber and gutta percha—threads:	
From—	
Great Britain	27,720
United States	52,360
Other countries	6,380
Totals	86,460

India rubber and gutta percha—sheets:	
Cut sheets	3,740
Elastic fabric	1,760
Insulated wire	440
Hard rubber	78,980
India rubber and gutta percha—tubes:	
Cut sheets	1,100
Elastic fabric	12,100
Other fabrics	6,380
Belting	120,120
Rubber coated fabrics, pieces	109,340
Other fabrics:	
From—	
Great Britain	38,500
Other countries	1,320
Totals	39,820

Boots and shoes—pairs:	
From—	
United States	23,297
France	10,293
Other countries	153
Totals	33,743
Elastic fabrics:	
From—	
France	25,960
Great Britain	12,760
Other countries	13,420
Totals	52,140

Clothing and articles for travel	1,760
Articles not specified:	
From cut sheets	12,760
Fabrics:	
From—	
France	218,680
Great Britain	110,440
Other countries	8,140
Totals	337,260

Tires and tubes:	
From—	
France	1,356,080
Great Britain	476,740
Other countries	31,240
Totals	1,864,060
Other rubber manufactures:	
From—	
France	926,200
Great Britain	772,640
United States	1,357,840
Other countries	1,320
Totals	3,058,000

Total Imports	71,485,445
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EXPORTS OF CRUDE AND MANUFACTURED RUBBER.	
Ten Months Ending October, 1916.	
Pounds.	Lira.
UNMANUFACTURED—	
India rubber and gutta percha—crude and reclaimed:	
To—	
United States	432,300
Great Britain	40,040
Spain	419,980
Totals	892,320

Totals	1,622,400
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	Ten Months Ending October, 1916.			Ten Months Ending October, 1916.			January, 1917.			
	Pounds.	Lira.		Pounds.	Lira.		Pounds.	£ Sterling.		
MANUFACTURED—										
India rubber and gutta percha —threads:			Tires and tubes:			Waste and reclaimed rub- ber	647,100	15,581		
To—			To—			Gutta percha	762,160	95,114		
France	9,460	.....	France	364,980	.....	MANUFACTURED—				
Great Britain	9,900	.....	Great Britain	3,530,560	.....	Apparel, waterproofed ...	.....	865		
Spain	11,880	.....	Switzerland	67,320	.....	Boots and shoes, doz. pairs	12,393	24,498		
Switzerland	9,460	.....	British India and Ceylon.	391,380	.....	Insulated wire .....	.....	10,582		
Argentina	3,740	.....	Australia	81,180	.....	Automobile tires and tubes	.....	147,828		
Other countries	3,960	.....	Argentina	869,440	.....	Motorcycle tires and tubes	.....	6,260		
Totals	48,400	440,000	Brazil	464,640	.....	Cycle tires and tubes .....	.....	6,428		
India rubber and gutta percha —sheets:			Other countries	554,400	.....	Tires not specified .....	.....	407		
Cut sheets	5,060	39,100	Totals	6,323,900	57,490,000	EXPORTS.				
Elastic fabric	2,640	5,400	Other rubber manufactures:			January, 1917.				
Insulated wire	880	1,200	To—			Pounds. & Sterling.				
Hard rubber	44,660	162,400	Albania	10,340	.....	UNMANUFACTURED—				
India rubber and gutta percha —tubes:			France	53,460	.....	Rubber, waste and re- claimed	1,846,300	34,443		
Cut sheets	11,220	91,800	Great Britain	53,900	.....	MANUFACTURED—				
Elastic fabric	113,960	310,800	Spain	10,780	.....	Apparel waterproofed:				
Other forms	105,160	334,600	Switzerland	52,360	.....	To—				
Beltting	1,540	4,900	Egypt	13,640	.....	France .....	.....	10,124		
Rubber coated fabrics not specified	129,360	499,800	Argentina	93,720	.....	British South Africa .....	.....	1,382		
Boots and shoes	2	10	Brazil	49,280	.....	British East Indies .....	.....	1,735		
Elastic fabrics:			Uruguay	23,760	.....	Australia .....	.....	5,097		
To—			Other countries	40,700	.....	New Zealand .....	.....	5,848		
France	7,480	.....	Totals	401,940	1,461,600	Canada .....	.....	6,636		
Greece	107,360	.....	Total Exports	66,842,910		Other countries .....	.....	35,414		
Spain	13,860	.....	The nominal value of a Lira is \$0.193.			Total .....	.....	66,236		
Switzerland	77,440	.....	UNITED KINGDOM RUBBER							
Egypt	23,540	.....	STATISTICS.							
Argentina	100,980	.....	IMPORTS.							
Brazil	101,640	.....	January, 1917.							
Chili	18,480	.....	UNMANUFACTURED—							
Cuba	30,580	.....	Crude rubber:							
Other countries	55,660	.....	From—							
Totals	537,020	3,661,500	Pounds. & Sterling.							
Clothing and articles for travel	3,740	39,100	Dutch East Indies							
Articles not specified, from cut sheets:			1,735,800							
To—			French West Africa							
Great Britain	11,220	.....	31,400							
Spain	440	.....	Gold Coast							
Argentina	22,660	.....	1,400							
Brazil	220	.....	Other countries in Africa							
Uruguay	3,300	.....	1,128,900							
Other countries	2,420	.....	121,163							
Totals	40,260	366,000	Peru							
Fabrics	76,340	312,300	128,400							
			13,093							
			485,400							
			67,368							
			3,075,800							
			424,600							
			6,562,600							
			858,877							
			2,295,800							
			312,972							
			53,566							
			388,700							
			17,862,700							
			2,378,331							

January, 1917.	
Pounds.	£ Sterling.
18,466,300	34,443
MANUFACTURED—	
Apparel waterproofed:	
To—	
France	10,124
British South Africa	1,382
British East Indies	1,735
Australia	5,097
New Zealand	5,848
Canada	6,636
Other countries	35,414
Total	66,236
Boots and shoes, doz. pairs	
Insulated wire	8,589
Submarine cables	50,066
Automobile tires and tubes	28,825
Motorcycle tires and tubes	51,023
Cycle tires and tubes	11,552
Tires not specified	32,907
Manufactures not specified	11,681
	147,632
EXPORTS—FOREIGN AND COLONIAL.	
UNMANUFACTURED—	
Crude rubber:	
To—	
France	323,800
Russia	2,872,400
United States of America	7,972,800
Other countries	1,647,000
Totals	12,821,000
Waste and reclaimed	22,906
Gutta percha	25,872
MANUFACTURED—	
Apparel, waterproofed	103
Boots and shoes, doz. pairs	2,217
Insulated wire	22,782
Automobile tires and tubes	81,855
Motorcycle tires and tubes	2,955
Cycle tires and tubes	1,789
Tires not specified	430
The value of £ Sterling is \$4.76.	

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.					London.				Liverpool.			
					January, 1917.							
UNMANUFACTURED—					Pounds.		£ Sterling.		Pounds.		£ Sterling.	
Crude rubber:												
From—												
German West Africa.....									3,700		260	
French West Africa									31,400		2,037	
Java					614,400		82,210					
Other Dutch Possessions in Indian Seas					1,121,400		151,125					
Spanish West Africa									2,600		193	
Italian East Africa					17,600		1,830					
United States									11,300		1,320	
Liberia									9,500		475	
Peru									128,400		13,093	
Brazil									2,028,500		291,168	
Egypt					13,000		2,144					
Gambia									100		5	
Gold Coast									1,400		152	
Nigeria									59,100		3,954	
Cape of Good Hope					97,300		14,515					
British East Africa					34,100		4,180					
Uganda					3,100		324					
Nyasaland					1,400		170					
Zanzibar and Pemba.....					4,500		625					
British India					485,400		67,368					
Straits Settlements					2,737,700		375,920		338,100		48,680	
Federated Malay States					6,554,400		857,739		8,200		1,138	
Ceylon and Dependencies					2,195,400		296,423		100,400		16,549	
British North Borneo					354,000		49,013					
New South Wales					10,700		1,605					
Fiji Islands					10,900		1,370					
British Guiana					1,900		258					
Totals					14,257,200		1,906,819		2,722,600		379,024	

UNMANUFACTURED—		London.		Liverpool.	
		Pounds.	£ Sterling.	Pounds.	£ Sterling.
Waste and reclaimed rubber:					
From—					
France	168,100	2,989	.....	.....	.....
Portuguese East Africa....	5,500	48	.....	.....	.....
United States	29,300	712	205,700	7,552	.....
Brazil .....	.....	.....	200	8	.....
Argentine Republic	90,300	1,050	.....	.....	.....
Channel Islands	1,900	25	.....	.....	.....
Cape of Good Hope	5,500	60	.....	.....	.....
Natal	10,200	204	.....	.....	.....
British India	19,700	315	600	33	.....
Ceylon and Dependencies...	1,500	16	.....	.....	.....
Totals	331,900	5,419	206,500	7,593	.....
EXPORTS.					
Waste and reclaimed rubber					
manufactures of the United Kingdom:					
To—					
France	23,100	1,401	29,660	1,111	.....
Denmark .....	.....	.....	44,200	177	.....
Spain	100,700	1,576	7,700	251	.....
Italy	109,700	1,479	48,400	971	.....
Japan .....	.....	.....	14,600	380	.....
United States of America ..	719,400	9,775	268,800	8,806	.....
Argentina	33,600	400	.....	.....	.....
Canada	18,000	215	.....	.....	.....
Totals	1,004,500	14,846	413,300	11,696	.....
Crude Rubber:					
To—					
Denmark	78,300	9,643	.....	.....	.....
Russia .....	.....	.....	323,800	41,203	.....
France	1,916,100	271,869	934,200	131,530	.....

RE-EXPORTS.

January, 1917.

UNMANUFACTURED--	London.		Liverpool.	
	Pounds.	£ Sterling.	Pounds.	£ Sterling.
Norway			12,600	1,540
Switzerland	8,700	1,349		
Spain	4,500	548	41,900	4,801
Italy	456,000	61,470	172,300	24,535
Japan			89,500	15,200
United States	7,019,800	976,720	394,400	35,270
Victoria	1,300	163	53,900	7,150
New South Wales	2,500	130		
Canada	534,000	75,032	163,600	14,930
Totals	10,021,200	1,396,924	2,186,200	276,159
Waste and reclaimed rubber:				
To--				
France	77,700	2,835	4,500	140
Russia			11,600	427
Italy			78,100	2,794
United States of America			47,500	1,680
Totals	77,700	2,835	141,700	5,041

The value of £ Sterling is \$4.76.

THE MARKET FOR RUBBER SCRAP.

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NEW YORK.

THE demand for rubber scrap has been of a routine nature for the past month, with buying confined to supplies needed for immediate requirements. The volume of business has been only fair, due to the restrictions placed on trading by the local embargoes and the congested conditions of the railroads. During the second week of the month the transportation situation at several important shipping points became easier and supplies moved quite freely. Considerable material was disposed of, but the consumers were soon satisfied and withdrew from the market. Then later in the month the threatened railroad strike prevented, for a time at least, the purchase of future requirements. That the rubber mills are well provided with abundant business is a well known fact, moreover heavy government orders have been recently booked so that the forecast is favorable for the rubber scrap market.

BOOTS AND SHOES. The consumers undoubtedly covered their requirements early in the month at prices around 9¼ delivered. Later the market softened, due to the arrivals of delayed shipments, and prices declined. Dealers were active during the last week, and sales at 9¼ cents delivered to the mills were reported. Trimmed and untrimmed arctics have declined ¼ cent since our last report.

AUTO TIRES. All grades have been dull and uninteresting, particularly the white G. & G. tires. Sales have been few and the volume of business small.

INNER TUBES. The lack of interest in this material is easily explained by the quiet position of the crude rubber market. Very little movement was noticed and prices firm but unchanged from a month ago.

MECHANICALS. While there was evidence of usual routine business from the rubber mills last month the situation has been quiet and prices unchanged.

London and Liverpool imports of waste and reclaimed rubber for January, 1917, were 538,400 pounds against 257,500 pounds for December, 1916. Exports for January were 1,417,800 pounds against 1,462,100 pounds for December.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

MARCH 28, 1917.

Prices subject to change without notice.

	Per Pound.
Boots and shoes.....	\$0.09¼ @
Trimmed arctics .....	.07¼ @
Untrimmed arctics .....	.06¼ @
White tires, Goodrich and Goodyear.....	.07¼ @ .08
Auto tires, standard white.....	.07¼ @ .07½
standard mixed .....	.06¼ @ .06½
stripped, unguaranteed .....	.04¼ @ .05
Auto peelings, No. 1.....	.10 @
No. 2.....	.08¼ @ .09
Inner tubes, No. 1.....	.26 @ .27
No. 2.....	.12 @ .13
red .....	.12 @ .13

Irony tires .....	.02¼ @
Bicycle tires .....	.04¼ @ .05¼
Solid tires .....	.05¼ @ .06
White scrap, No. 1.....	.13¼ @ .14
No. 2.....	.10 @
Red scrap, No. 1.....	.08 @
No. 2.....	.10 @ .11
Mixed black scrap, No. 1.....	.04 @
No. 2 .....	.04 @
Rubber car springs.....	.04¼ @
Horse shoe pads.....	.04¼ @
Matting and packings.....	.01 @ .01½
Garden hose.....	.01¼ @ .01¾
Air brake hose.....	.05¼ @ .05¾
Cotton fire hose.....	.02¼ @
Large hose .....	.01¾ @
Hard rubber scrap, No. 1, bright fracture.....	.26 @
Battery jars (black compound).....	.02¼ @
Insulated wire stripping.....	.03¼ @
Rubber heels .....	.03¼ @

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright 1917.

NEW YORK.

THE American cotton market has been well supported during the past month and prices show gradual advances since our last report. February 26, middling spot cotton was 16.55 cents, and on March 18, it had reached the 18-cent mark. Later in the month the demand became more active due to various rumors of a bullish nature that on March 26, sent the price up to 19.20 cents. The grades of cotton used in the manufacture of tire fabrics costs about 1 cent a pound more than the regular sorts.

From the census report it is estimated that the available supply of American cotton for distribution during the season will approximate 14,000,000 bales, including linters. At the present rate of domestic consumption the season's requirements will be 7,000,000 bales, leaving about 7,000,000 bales for export and carry over. As a result of the unfavorable position of Sea Island and the uncertainty of the supply of Egyptian, there has been heavy buying of American peelers as a protective measure against failure of the regular supply.

EGYPTIAN COTTON. The British embargo on Egyptian cotton that went into effect early in March, applies to shipments from Egypt and England to neutral countries in British bottoms. Should the present stocks fail to carry the mills until January when the new crop arrives, there may be a serious shortage of Egyptian cotton in this market. London stocks are said to be exhausted. The situation, in case of war with Germany, would apparently be relieved by shipments being made in American bottoms. The acuteness of the market, due wholly to transportation difficulties, has resulted in higher prices for all grades of Egyptian cotton.

SEA ISLAND COTTON. The southern markets have exhibited much activity and advancing prices, due to the British embargo on Egyptian cotton. The volume of business has been large, the equivalent of 65 cents being offered for round lots. There was evidently little cotton remaining unsold by the end of the month and prices were unquotable on account of the unsettled market conditions.

TIRE FABRICS. While the general demand was more quiet than a month ago and fewer buyers were in evidence, there was much interest exhibited by the consuming trade in the present market. The doubt that now threatens supplies of Egyptian and Sea Island cotton has created an active interest in Peelers and combed peeler fabric is in demand. This is a precautionary measure on the part of the consuming trade and to just what extent American cotton fabric may be substituted for Sea Island and Egyptian remains to be seen. Seventeen, ¼-ounce, carded peeler fabric is quoted 85 to 90 cents a square yard. The other grades of standard fabrics have advanced 15 to 20 cents a pound since our last report.

DUCKS, SHEETINGS, DRILLS, ETC. The market for all these fabrics has been very active, being stimulated by government requirements that have taken precedence over all orders. The increased government business that has fallen to the rubber mills

is shown by the many calls for deliveries ahead of contract dating. A feature of the month was the heavy buying from the Canadian mills, also for government requirements, with delivery as the principal condition of sale. Spot stocks are very scarce and the mills are sold up to the end of the year. Prices have remained unchanged and very firm.

RAINCOAT FABRICS. The reported withdrawal of certain raincoat cloths cannot be verified. The demand has been steady and all fall lines are well sold up. Government business is responsible for heavy buying of certain lines and spot stocks are consequently low. Prices are steady, with few changes worth recording.

NEW YORK QUOTATIONS.

MARCH 29, 1917.

Prices subject to change without notice.

Airplane and Balloon Fabrics:

Wamsutta, S. A. I. L. No. 1, 40-inch.....yard \$0.35 @
No. 4, 38½-inch......35 @

Wool Stockinettes—52-inch:

A—14-ounce.....yard 1.38 @
B—14-ounce......1.65 @
C—14-ounce......1.92 @

Cotton Stockinettes—52-inch:

D—14-ounce.....yard .55 @ .60
E—11½-ounce......46 @ .55
F—14-ounce......60 @ .65
G—8-ounce......52 @ .55
H—11-ounce......55 @ .60
I—9-ounce......46 @ .50

Colors—white, black, blue, brown.

Knitabac Stockinette.....lb. 1.00 @ 1.05

Tire Fabrics:

17¼-ounce Sea Island, combed.....square yard 1.45 @ 1.55
17¼-ounce Egyptian, combed......1.25 @ 1.35
17¼-ounce Egyptian, carded......1.07 @ 1.12
17¼-ounce Peelers, combed......85 @ .90
17¼-ounce Peelers, carded......70 @

Sheeting:

40-inch 2.35-yard.....yard .15¼ @
40-inch 2.50-yard......14¼ @
40-inch 2.70-yard......14 @
40-inch 2.85-yard......13 @
40-inch 3.15-yard......12¼ @

Osnaburghs:

40-inch 2.25-yard.....yard .16¼ @
40-inch 2.48-yard......15 @
37½-in. 2.42-yard......15¼ @

Mechanical Ducks:

Hose.....pound .37 @ .38
Belting......36 @ .37

Carriage Cloth Duck:

38-inch 2.00-yard enameling duck.....yard .20 @
38-inch 1.74-yard......22¼ @
72-inch 16.66-ounce......44¼ @
72-inch 17.21-ounce......46 @

Drills:

38-inch 2.00-yard.....yard .19 @
40-inch 2.47-yard......15¼ @
52-inch 1.90-yard......20¼ @
52-inch 1.95-yard......20 @
60-inch 1.52-yard......26¼ @

Imported Woollen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:

63-in. 3¼ to 7½ ounces.....yard .38 @ 1.55
36-inch. 2¼ to 5 ounces......35 @ .85

Imported Plaid Lining (Union and Cotton):

63-inch, 2 to 4 ounces.....yard .35 @ .75
36-inch, 2 to 4 ounces......25 @ .50

Domestic Worsted Fabrics:

36-inch, 4½ to 8 ounces.....yard .35 @ .65

Domestic Woven Plain Linings (Cotton):

36-inch, 3¼ to 5 ounces.....yard .10 @ .18

Raincoat Cloth (Cotton):

Romazine.....yard .08 @ .09¼
Twill......12 @ .18
Tweed......25 @ .35
Tweed, printed......07¼ @ .13
Plaid......08¼ @ .10
Repp......24 @ .27

Burlaps:

32—7½-ounce.....100 yards 6.75 @
40—7½-ounce......7.50 @
40—8-ounce......7.60 @
40—10-ounce......8.50 @
40—10½-ounce......8.65 @
45—7½-ounce......8.65 @
45—8-ounce......8.75 @
48—10-ounce.....11.25 @

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1916, TO FEBRUARY 14, 1917.

To—	1916-17.	1915-16.	1914-15.
Liverpool.....bales	146,575	163,791	124,995
Manchester.....	106,190	95,604	105,391

Total shipments to Great Britain.....	252,765	259,395	230,386
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To—	1916-17.	1915-16.	1914-15.
France.....15,134 }	22,665	33,945	25,114
Spain.....7,531 }			
Italy.....70,701 }	33,907	31,743	93,496
Switzerland.....13,206 }			
Russia.....	21,238	32,159	27,490
Greece.....65	50	1,604	

Total shipments to Continent.....	77,875	97,897	147,704
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To—	1916-17.	1915-16.	1914-15.
United States.....	96,539	138,033	88,158
India.....100 }	8,055	16,410	8,038
Japan.....7,955 }			

Total shipments to all parts.....	435,234	511,735	474,286
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Total crop (interior gross weights) cantars.....	4,726,518	6,473,726	
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(Compiled by Davies, Brunchi & Co., Liverpool.)

SEA ISLAND CROP MOVEMENT.

FROM AUGUST 1, 1916, TO MARCH 2, 1917.

	Receipts.	1916-17.	1915-16.
Stock on hand, August 1, 1916—			
Savannah, 2,401; Charleston, 107.....bales	2,508	2,382	
Received at Savannah (Gross).....	42,214	34,696	
Received at Charleston.....	3,326	5,532	
Received at Jacksonville.....	34,748	25,192	

Totals.....	82,796	67,802
Less Exports.....	77,246	56,574

Stock March 2, 1917—		
Savannah, 5,459; Charleston, 91.....	5,550	11,228
Crop in sight at all ports to date.....	*79,933	65,023

EXPORTS.

From—	To—	Great Britain.	Continent.	Northern Mills.	Southern Mills.	Totals.
Savannah.....		1,252	120	32,550	5,120	39,156
Charleston.....		313	...	3,029	...	3,342
Jacksonville.....		...	...	34,748	...	34,748
Totals.....		1,565	120	70,327	5,120	*77,246
1915-16.....		1,101	1,060	50,136	4,277	56,574
Inc. 464	Dec. 940	Inc. 20,191	Inc. 843	Inc. 20,672		

*In addition to the exports shown above, it is estimated that at least 20,000 bales have been shipped direct from interior points to Southern mills and to Northern mills via Norfolk, but the exact figures of this movement will not be available until the end of the season.

†Including 114 bales burned at Savannah.
(Compiled by John Malloch & Co., Savannah, Georgia.)

THE MARKET FOR CHEMICALS AND COMPOUND-INGREDIENTS.

Copyright, 1917.

NEW YORK.

THE metal market has not changed materially during the past month, and the tendency on the part of both buyers and sellers to await developments has dominated the situation. Copper has been quiet and unchanged. The strong position of lead has remained unchanged, but later in the month easier conditions prevailed. Spelter was dull and inactive, resulting in easier prices. Antimony was quiet and unchanged until late in the month when the market became stronger.

The demand for rubber chemicals has been active in all lines, but the difficulty in obtaining materials and forwarding supplies appears to be even greater than a month ago. In view of the abnormal situation, and with spot prices at almost prohibitive figures, the necessity of booking orders as far ahead as possible is apparent.

ANILINE OIL. The foreign and domestic demand has been active and supplies are low, due to the fact that there are now

comparatively few producers. The supply is hardly keeping up with the demand, and prices are from 32 to 35 cents.

CARBON BLACK. The demand against contracts has been active and stocks are small. Spot prices are nominal and controlled by second-hand interests. The market has advanced 12 to 15 cents since a month ago.

IRON OXIDE. The bright grades are very scarce, and prices have advanced 2 cents since our last quotations. There is an active demand for all grades.

LEAD PIGMENTS. The strong position of the raw material is reflected in the lead pigments. Red oxide, sublimed blue, sublimed white, basic carbonate, litharge and orange mineral have advanced in price during the month.

SULPHUR FLOUR. The firm position of the crude material and the aggravated condition of transportation has resulted in an advance in price. Sulphur flour is now selling for \$2.45 per hundredweight in carload lots.

VERMILION. Both English and Chinese grades are scarce and high in price, due to the demand and difficulty in obtaining the raw material. English vermilion is now quoted \$1.85 to \$2 a pound.

ZINC OXIDE. A new price schedule for French process zinc oxide in carload lots will take effect April 1, covering contract sales during the second quarter of this year. The prices are lower than those of the previous schedule. There is no change in the American brands of zinc oxide.

NEW YORK QUOTATIONS.

MARCH 26, 1917.

Subject to change without notice.

Accelerene	lb.	\$2.62	@	
Acetone (drums)	lb.	.23	@	
Acid, acetic, 28 per cent. (bbls.)	gal.	.03 1/2	@	.04 1/2
creylic (crude)	gal.	.75	@	1.00
glacial, 99 per cent. (carboys)	lb.	.25	@	.26
muriatic, 20 degrees	lb.	.01 1/2	@	
nitric, 36 degrees	lb.	.04 1/2	@	
sulphuric, 66 degrees	lb.	.01 1/2	@	
Aldichde ammonia	lb.	1.00	@	25.00
Aluminum Flake (carloads)	ton	21.00	@	25.00
Ammonium carbonate	lb.	.09 1/2	@	.12 1/2
Antimony, crimson, sulphuret of (casks)	lb.	.50	@	
crimson, "Magnetco"	lb.	Nominal		
crimson, "Mephisto" (casks)	lb.	.45	@	
golden, sulphuret of (casks)	lb.	.27	@	.40
golden, "Magnetco"	lb.	Nominal		
golden, "Mephisto"	lb.	.28	@	
golden, sulphuret, States brand, 16-17 per cent.	lb.	.28	@	
red sulphuret, States brand	lb.	.23	@	
vermilion sulphuret	lb.	.60	@	
Asbestine	ton	17.00	@	20.00
Asbestos	ton	20.00	@	40.00
Anthracite	lb.	.03 1/2	@	
Barium sulphate, precipitated	lb.	.04 1/2	@	.05
Barytes, pure white	ton	30.50	@	32.00
off color	ton	15.00	@	22.00
Basofo	ton	80.00	@	
Benzol, 100 per cent.	gal.	.70	@	
90 per cent.	gal.	.65	@	
Beta-Naphthol (f. o. b. New York)	lb.	.90	@	.95
Brown, sienna, raw powdered	lb.	.05	@	.12
umber, raw powdered	lb.	.04 1/2	@	.05
Bone ash	lb.	.10	@	
black	lb.	.15	@	
Cadmium tri-sulphate (f. o. b. London)	lb.	Nominal		
sulphide, yellow	lb.	2.25	@	
Canella gum	lb.	.33	@	
Carbon, bisulphide (drums)	lb.	.05	@	
black (cases)	lb.	.27	@	.35
tetrachloride (drums)	lb.	.15	@	.18
Caustic soda, 76 per cent.	lb.	.04 1/2	@	.05 1/2
Chalk, precipitated, extra light	lb.	.04	@	
China clay, domestic (powdered)	ton	17.50	@	18.00
imported (powdered)	ton	40.00	@	
Chrome, green	lb.	.15	@	.20
yellow	lb.	.23	@	.25
Cotton linters	lb.	.07 1/2	@	
Excellerex	lb.	.85	@	.90
Fossil flour	lb.	.03	@	.03 1/2
Gas black	lb.	.27	@	
Gilsonite	ton	40.00	@	
Glue, high grade	lb.	.22	@	.60
medium	lb.	.17	@	.27
low grade	lb.	.17	@	.55
Glycerine, C. P. (drums)	lb.	.54 1/2	@	
Graphite, flake (400 pound bbl.)	lb.	.25	@	
powdered (400 pound bbl.)	lb.	.08	@	
amorphous	lb.	.07	@	
Green oxide of chromium (casks)	lb.	.80	@	.85
Ground glass (fine)	lb.	.02 1/2	@	.02 3/4
Hexamethylene Tetramine	lb.	.65	@	.75
Indian red, reduced grades	lb.	.04 1/2	@	.07 1/2
pure	lb.	.05	@	.10
Infusorial earth, powdered	ton	65.00	@	

Iron oxide, red, reduced grades	ton	65.00	@	70.00
red, pure, bright	lb.	.02 1/2	@	.03 1/2
Ivory, black	lb.	.13	@	.15
Lampblack	lb.	.18	@	.30
Lead, red oxide of	lb.	.06	@	.13
sublimed blue	lb.	.10 1/4	@	.11
sublimed white	lb.	.08 1/4	@	.09
white, basic carbonate	lb.	.08 1/4	@	.09 1/4
white, basic sulphate	lb.	.08 1/4	@	.09 1/4
black hyposulphite (Black Hypo)	lb.	.48	@	
Lime, flour	lb.	.01 1/2	@	.02
Litharge	lb.	.10	@	.10 1/2
English	lb.	.12 1/2	@	.13
sublimed	lb.	.10 1/4	@	.10 1/4
Lithopone, imported	lb.	.10	@	.10 1/4
domestic	lb.	.06 1/2	@	.06 1/4
Beckton white (carloads)	lb.	Nominal		
Magnesia, carbonate	lb.	.11	@	.13
calcined, heavy	lb.	.65	@	.70
light	lb.	.75	@	.80
Magnesite, calcined, powdered	ton	35.00	@	39.00
Mica, powdered	lb.	.03 1/4	@	.05
Mineral rubber	lb.	.01	@	.02
"M. R. X."	ton	100.00	@	
"Genasco" (carloads)	ton	37.00	@	
"Richmond Brand"	lb.	.03	@	
"No. 64 Brand"	ton	40.00	@	
"Refined Elaterite"	lb.	.05	@	
"Rubra"	ton	32.50	@	
Naphtha, stove gasoline (steel bbls.)	gal.	.24	@	
66@68 degrees (steel bbls.)	gal.	.29	@	
68@70 degrees (steel bbls.)	gal.	.30	@	
V. M. & P. (steel bbls.)	gal.	.21	@	
Oil, aniline	lb.	.32	@	.35
corn, refined (Argo)	cwt.	14.01	@	
linseed (bbl.)	gal.	.93	@	
palm	lb.	.14 1/2	@	
paraffin	gal.	.17	@	
pine (cases)	gal.	.58	@	
rapeseed, blown	gal.	1.15	@	1.17
rosin, heavy body	gal.	6.75	@	
tar (cases)	gal.	.22	@	
soluble aniline colors, yellow, orange	lb.	2.50	@	
Orange mineral, domestic	lb.	.12 1/2	@	.13 1/4
Paragol (carloads)	cwt.	10.89	@	
Petrolatum	lb.	.06 1/4	@	
Petroleum grease	lb.	.04	@	
Pine tar	lb.	9.25	@	
Pitch, burgundy	lb.	.03 1/4	@	.04
coal tar	bbl.	4.50	@	
pine tar	lb.	.01 1/4	@	
Plaster of paris	lb.	1.50	@	1.70
Prussian blue	lb.	.65	@	.90
Pumice stone, powdered (bbls.)	lb.	.03	@	.04
Resin, Pontianak, refined	lb.	Nominal		
granulated	lb.	Nominal		
fused	lb.	Nominal		
Rosin (500 pound bbls.) @ 280 lbs.	lb.	5.95	@	8.50
Rotten stone, powdered	lb.	.02 1/2	@	.04
Rubber black	lb.	.06	@	
Rubber substitute, black	lb.	.09	@	.12 1/4
white	lb.	.13 1/4	@	.18
brown	lb.	.13	@	.18
Rubhide	lb.	.35	@	
Shellac, fine orange	lb.	.58	@	
Silex (silica)	ton	30.00	@	50.00
Soapstone, powdered	ton	14.00	@	20.00
Starch, corn, powdered	lb.	3.69	@	
Sulphur chloride (drums)	lb.	.08	@	
Sulphur, flour, velvet, brand (carloads)	cwt.	2.45	@	
Bergenport, pure soft brand	cwt.	2.20	@	
Talc, American	ton	14.00	@	18.00
French	ton	24.00	@	28.00
Toluol, pure	gal.	1.75	@	2.00
Triplite earth, powdered	ton	65.00	@	70.00
Turpentine, pure gum spirits	gal.	.46 1/2	@	
wood	gal.	.41 1/2	@	
Venice	gal.	.11	@	.12
Ultramarine blue	lb.	.18	@	.45
Vermilion, brilliant	lb.	Nominal		
Chinese	lb.	.95	@	1.00
English	lb.	1.85	@	2.00
Wax, beeswax, white	lb.	.55	@	.60
ceresin, white	lb.	.18	@	.22
carnauba	lb.	.35	@	.55
ozokerite, black	lb.	.55	@	.60
montan	lb.	.32	@	.33
paraffin, refined 118/120 m. p. (cases)	lb.	.08	@	
123/125 m. p. (cases)	lb.	.08 1/2	@	
128/130 m. p. (cases)	lb.	.09 1/2	@	
133/136 m. p. (cases)	lb.	.11	@	
crude, white, 117/119 m. p. (bbls.)	lb.	.06 1/4	@	.06 1/2
yellow, 124/126 m. p. (bbls.)	lb.	.07 1/4	@	
Whiting, Alba	cwt.	1.00	@	1.25
commercial	cwt.	1.00	@	
gliders	cwt.	1.10	@	
Paris, white, American	cwt.	1.25	@	
English cliffstone	cwt.	1.50	@	
Wood pulp XXX (carloads)	ton	Nominal		
Yellow ochre (Satin)	lb.	.03	@	
india rubber	lb.	1.50	@	
Zinc oxide, American process, horsehead brand	lb.	Nominal		
"XX red"	f. o. b. factory lb.	.10	@	
"special"	f. o. b. factory lb.	.10 1/2	@	
French process, red seal	f. o. b. factory lb.	.17 1/4	@	
green seal	f. o. b. factory lb.	.18 1/4	@	
white seal	f. o. b. factory lb.	.18 1/4	@	
Zinc substitutes	ton	30.00	@	
Zinc sulphide, pure	lb.	Nominal		



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